IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication MARCH 9, 1961

Larry Williams

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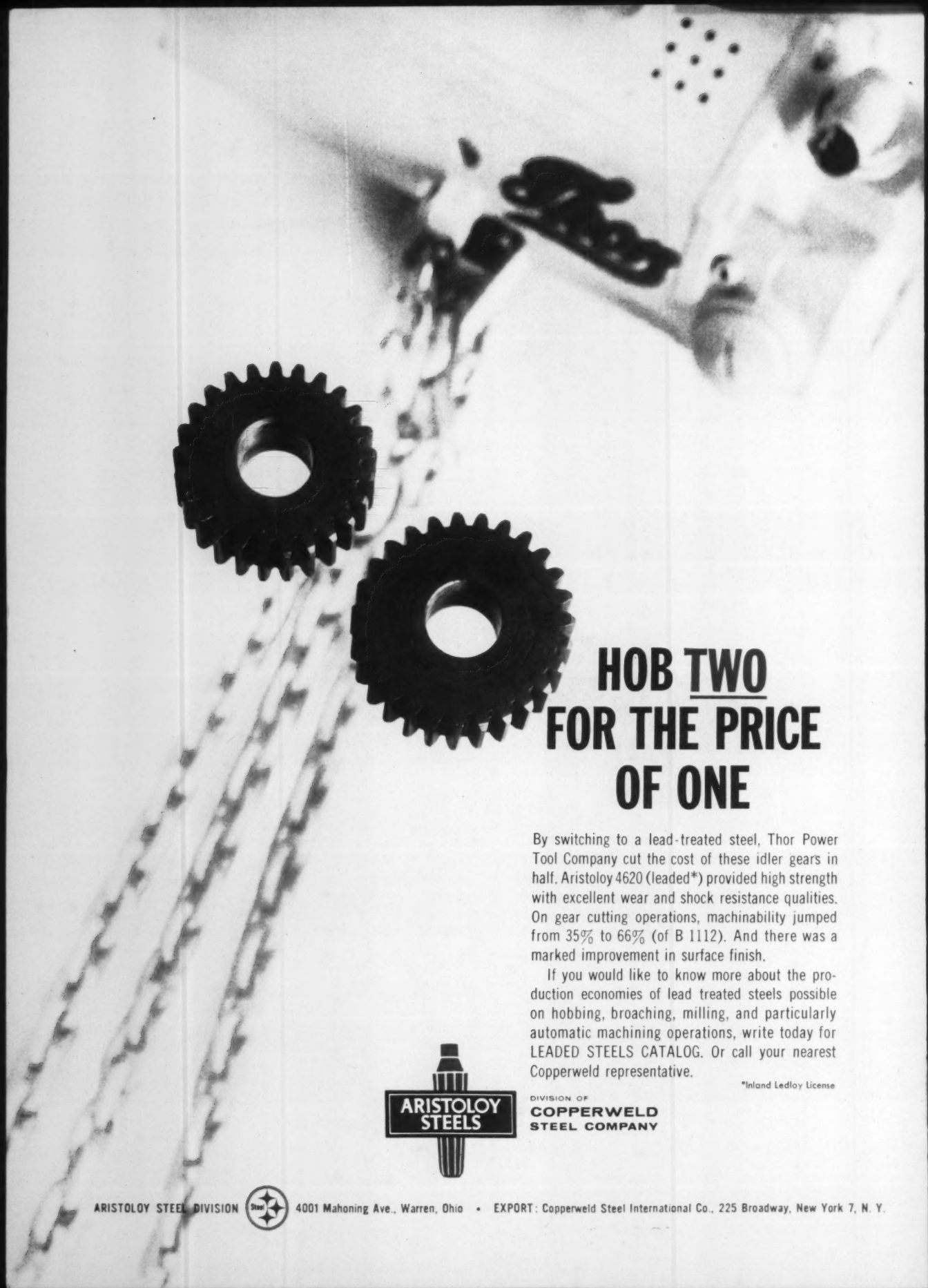

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March 9, 1961—Vol. 187, No. 10

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Indexed in Applied Science & Technology Index and Engineering Index.

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The IRON AGE, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Second class postage paid at Philadelphia Pa. Price to the metalworking industries only, $2 for 1 year, $3 for 2 years in U.S. and Canada; all others $15 for one year. Latin America $25. Other Foreign $35. Single copies 50¢. Annual Issue $2. Cable: Chilton Philadelphia.

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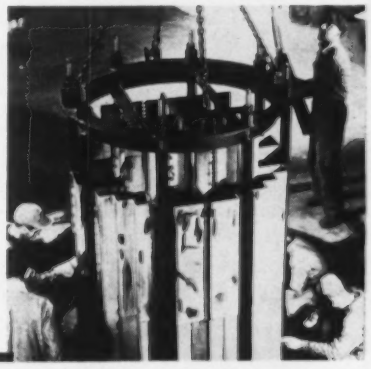
Special This Week

Get Set for New Plate Markets

Steelmakers are investing heavily in continuous heat-treat lines for alloy-steel plates. They plan to have a ready capacity for new market demands. Behind their confidence are strong economic factors. This year, they'll hit high gear with heat-treated plates. ***p. 85***

Homebuilders Predict '61 Rise

Homebuilders, plagued by the nation's economic insecurity and high costs, predict only a slight increase in housing activity this year. The industry says low-cost and high-value homes would open new markets. ***p. 55***



Nuclear Market May Explode

It's growing steadily now. But the AEC expects a nuclear market explosion when the right reactor is developed. To share in the orders resulting, industry must first understand this market. ***p. 60***

Next Week

New Era Coming in Labor Talks?

As the first of a series on the vital issues affecting business, The IRON AGE interviews labor relations specialist Dr. George W. Taylor. The principal question: Should the public participate in labor disputes?

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Better Do It Yourself: Uncle Sam Won't Help Much

The new Administration has convinced the man on the street it can perform miracles.

It says it will do all it can for the unemployed. It has promised to do a lot for business. And it will try.

After all, President Kennedy is the people. They elected him, and he is supposed to do what they want. If he doesn't, he may lose support.

But just because the people have handed over their responsibility to Mr. Kennedy is no reason businessmen should feel they are going to get much help from their government. They aren't. The sooner they realize this, the better it will be for them—and for the country.

Take the help on depreciation. The rumors have been hedged with talk about all kinds of methods and whatnot. But even if the help comes, there will have to be "make-ups" for this type of windfall.

What is lost one way has to be made up in another. The best way to lick this is to do your own scrapping of machinery and techniques. Do it on your own plan, with your own money, and with your own brains and capacity to see ahead.

And what do you see ahead?

The government cannot help business in very many ways. The best way is not to be profligate. It has to prevent actions that are injurious to the nation. But as to handouts and special treatment—well, it is often robbing Peter to pay Paul.

The best way to lick your troubles is to get out of them on your own. Then, if the government does something that really is helpful, you are miles ahead.

The wishful thinking that some of us are doing suggests we have a bottomless barrel from which we can get the wherewithal to act silly. We haven't.

Mr. Kennedy has his hands full. He has problems around the world and at home which will tax him to the utmost. Don't count too much on getting your own brand of assistance.

If you do, you will be left at the post—wiser but sadder. With foreign competition and problems at home posing more and more difficulties, this is no time to look for miracles.

To learn the hard way again and again does produce a robust nature. But it may put you under in the process.

Moral: Do it yourself!

Tom Campbell

Editor-in-Chief

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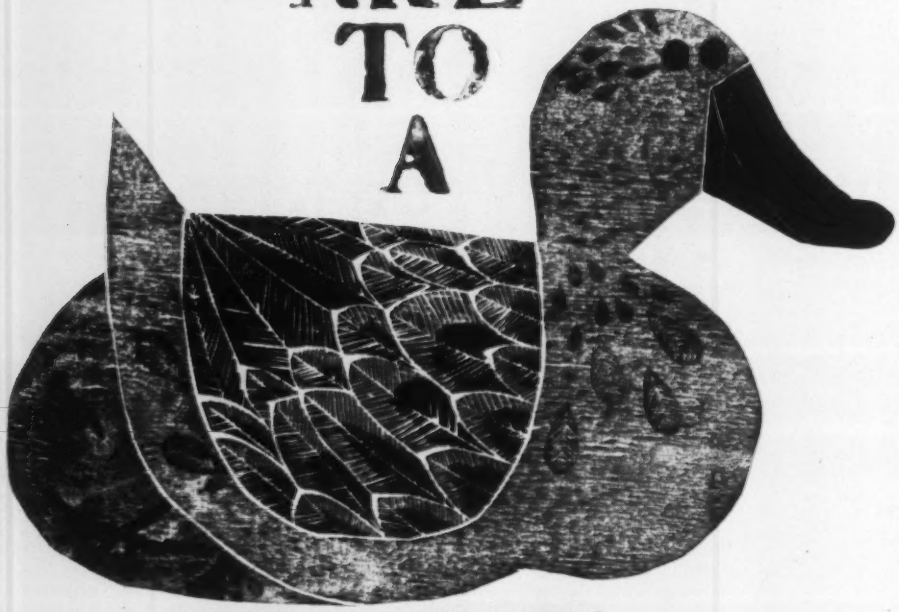

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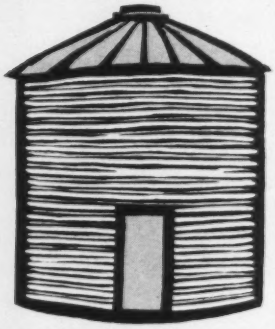

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That "Better Feeling" Expands

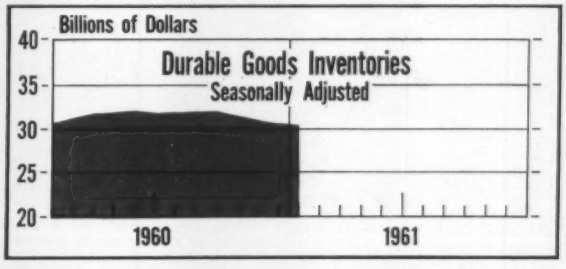
The first faint inklings of a seasonal upturn felt a week ago continue to gain strength. There isn't much to go on yet, but, at the same time, there are more indications each day of more optimism. Here are some:

Most important, there is a definite upturn in non-automotive steel orders. Home builders are not jumping for joy, but predict a better year. Purchasing agents appear ready to quit cutting back and to start placing a little advance business. Even auto schedules for March are up, although nothing to boast about. Structural steel bookings are also up. And, again with qualifications, the lethargic scrap market is moving upward.

On the basis of statistical indicators, the pickup is not evident. But this is due to the lag between gathering and publishing. A month from now, you will see some mild gains and reversals from the long downtrend.

Are Inventories Liquidated?

One fact that can't be ignored: The long-awaited

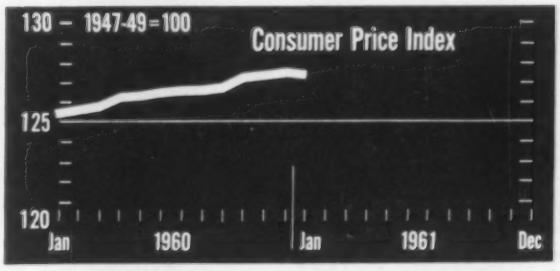


end of inventory cutbacks just has to be here. Durable goods inventories dropped another $200 million during February, but the rate of decline has slowed perceptibly. March figures should point to a bottoming out.

At $30.6 billion at the end of February, durable goods industries stocks were at the level of a year ago when the steel buildup was under way. Another factor to note: The January drop in inventories, unlike the liquidation of the final quarter of last year, occurred in finished goods rather than in working stocks. This could mean that inventory control in terms of purchases has already hit bottom.

Cost of Living Dips a Bit

Reflecting the tough conditions of doing business these days, the Consumer Price Index dropped 0.1 point in January. This is the first decline since January 1960. The minute drop, which actually represents the fourth consecutive month of stability, brought the



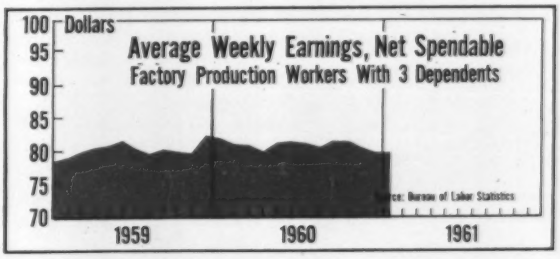
index to 127.4 (1947-49 = 100). Almost all items making up the index declined, but with services, as a group, making a small gain.

Scrap Market Headed Up

From Tokyo—The U. S. scrap market is in for a swift climb because of a combination of export circumstances. The Japanese, already in the market for record tonnages, have split into two groups. Before, there was one group with seven shippers from Japan. Now, there are two groups of 15 shippers. The result: Competitive bidding from Japanese interests. This will come at a time when U. S. mills are venturing back into the market in competition with export.

Buying Power Down From a Year Ago

As might be expected, earnings of production workers are not on the upgrade. However, a factory worker's spendable earnings held level in January after the recent declines. And, because of the little change in cost-of-living, buying power remained static. A factory worker with three dependents had take-home pay of $79.97 per week in January. A year ago, it



reached $82.14, but decline in overtime and weekly hours is taking its toll of the worker's pay check. Spendable earnings have dropped 2.5 pct since last year, with buying power down 4 pct.

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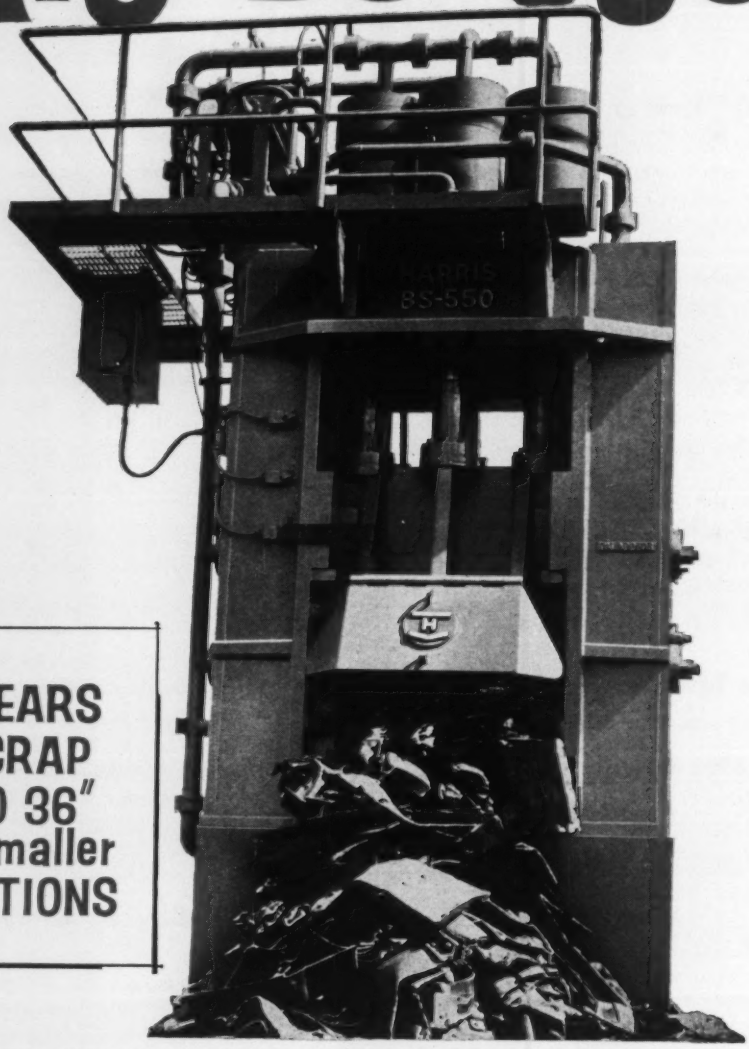

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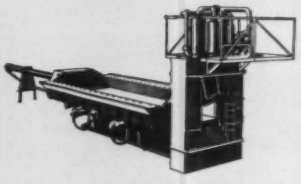

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Hoffa: Monitors Are Run Off the Road

Teamster president James R. Hoffa is well on the way toward getting both hands firmly on the wheel that guides the 1.7 million member union. He has the green

Hoffa: In the driver's seat.

light to hold a special convention and election. It's scheduled for Miami in May.

And Mr. Hoffa should have no trouble winning handily a clear title to the union's presidency. Then he'll be free of the court-appointed, three-man board of monitors that has plagued him since 1957.

The monitors were appointed by Federal District Judge F. Dickinson Letts. This board was part of the settlement of a suit brought by 13 anti-Hoffa union members who charged the 1957 election was rigged. The board's surveillance will end only after the union Teamsters hold a new convention and election.

Mr. Hoffa has indicated that the end of the monitors will mean the beginning of big organizing drives extending beyond truck drivers and warehousemen. Airlines are one target. The industrial field is another.

It could mean that the Teamsters plan to declare open season on the AFL-CIO which threw out Mr. Hoffa's union in 1957 on charges of corruption.

Ford Workers Earn Record Wage in 1960

Average weekly and hourly earnings of Ford Motor Co. employees in 1960 were the highest in the company's 57 year history. Average weekly gross earnings of hourly employees were $126. This is exclusive of $24 weekly in fringe benefits. Earnings in 1959 were $122 in addition to $23 weekly in fringe benefits.

Average gross hourly earnings in 1960 were $3.00 plus 59 cents an hour in fringe benefits.

Will the President Be The Board Chairman?

Should the President have the power to take over industries in an emergency?

Congress is thinking about giving him the power. It would be applicable where strikes "affect the national health and safety." And it has the backing of both Republicans and Democrats as well as the President.

A Senate bill would empower the President to direct the Attorney General to go into court to seek appointment of a "special receiver." The "receiver" would operate the affected industry until the strike is settled.

UAW: Auto Workers Revolt

Union members at Chrysler Corp.'s Nine Mile Press Plant are in revolt against the United Auto Workers. Some workers want to dump the union.

Trouble developed when some Local 869 members circulated petitions asking that the UAW be ousted as bargaining agent for 1000 local members still working.

The move followed Chrysler's announcement that the press plant would take over stamping work done at its Hamtramck Conant Plant.

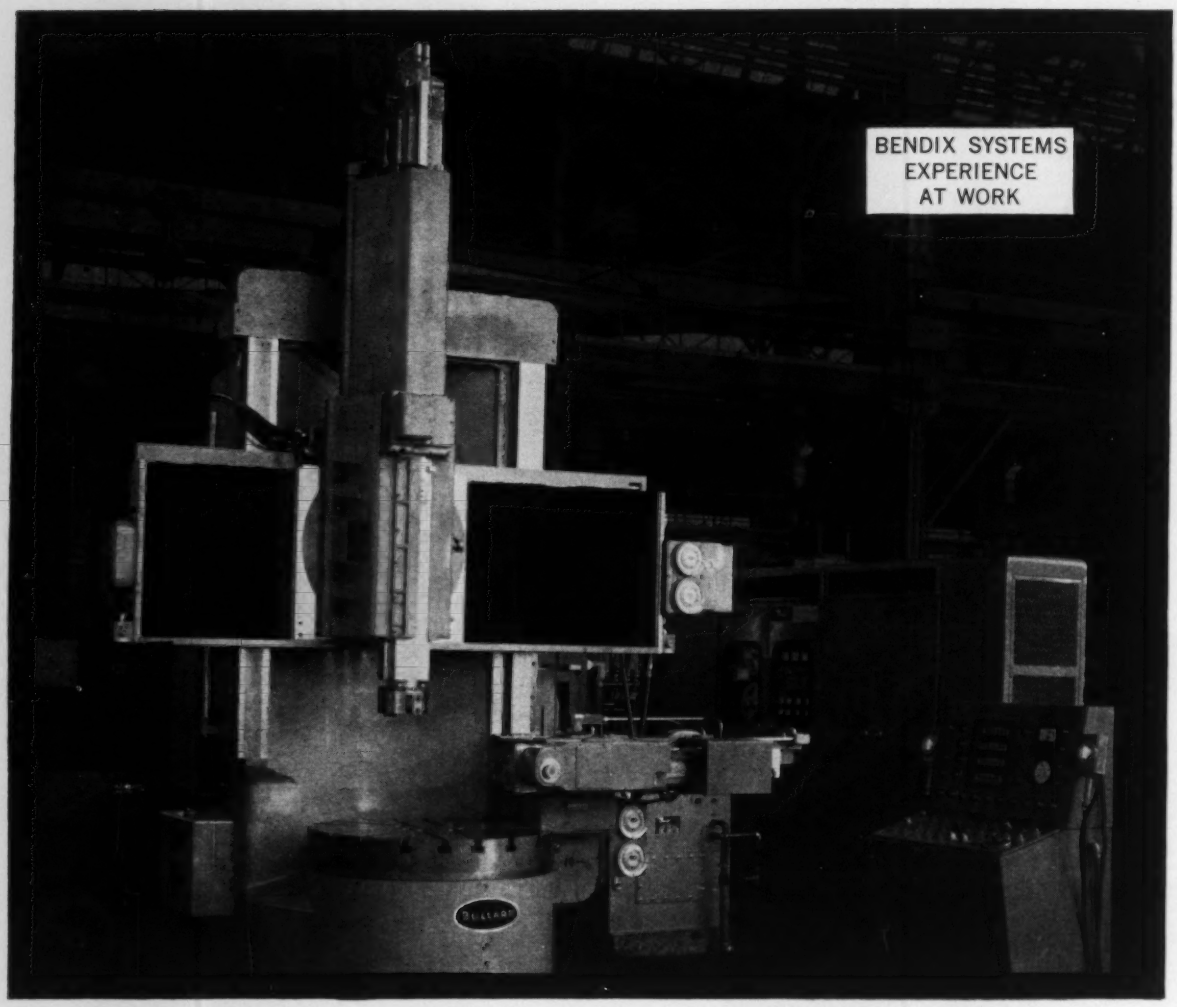
Disgruntled members are afraid many of them will be laid off if workers with more seniority are allowed to switch from the Conant plant along with the stamping operation.

UAW International has not yet decided whether to put an administrator over the local's affairs. It represents about 1800 men at the press plant. The local president has asked for an administrator on the grounds that an emergency exists.

Norman Matthews, director of the UAW's Chrysler department, says the press plant problem is representative of a general Chrysler situation. Work has been "constantly shifting from one plant to another."

He says he symphathizes with those who may be laid off when workers are transferred to follow their jobs. But he personally is against a change in the company-union pact allowing such transfers.

Layoffs at the Nine Mile Plant have reduced the normal 2000-man work force to about 1000.



BENDIX SYSTEM ENGINEERING PROVIDES OPTIMUM NUMERICAL CONTROL FOR TURRET LATHE

Shown above is a Bullard four-axis vertical turret lathe equipped with Bendix DynaPath-14 contouring control unit. In this application, the selection of tools and spindle speeds is programmed, as is the motion of both slides.

Bendix application engineers, with accumulated experience in mechanical and hydraulic analysis of machine tools, worked closely with Bullard to produce this wedding of machine tool and numerical controls. And Bendix systems experience gained in working on other contour turning applications (with such companies as Ex-Cell-O, Heald, and Giddings & Lewis) assures the user correct application of control unit to machine tool.

In addition to contour turning applications, Bendix engineers numerical control systems for milling, grinding, drilling and jig boring machines. We have developed and applied controls to 2-, 3-, 4-, and 5-axis systems, both continuous path and point-to-point. These controls are being used daily in plants across the country to increase machine tool efficiency, reduce lead times, and make parts of consistently high accuracy.

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★ Defense Moves In on Patents

Defense Dept. patent policy is shifting against contractors.

Congressional patent men tell The IRON AGE that the Pentagon has begun taking steps toward retaining rights to patents developed through research and development contracts.

Pentagon policy heretofore has given almost sole rights to patents to companies which have developed them.

The move which indicates the policy shift is a revision in the Defense Dept.'s procurement regulations. The revision notes, "The Dept. of Defense recognizes that there may be some situation in which it will be desireable in the public interest to obtain full title to inventions made under the contracts."

The regulation says the Government may wish to acquire patent title:

1. In a new technical field where there is no significant non-government experience to build upon.

2. Where the contractor is coordinating or directing the work of others, to prevent the possibility or appearance of private advantage as to the ideas of others.

3. In recognition of the overriding public interest in fields directly relating to the health or safety of the public if their availability for public use will not depend on patent incentives.

Defense Dept. procurement chief, G. C. Bannerman, says the regulation changes just restate "the long standing basic policy of the Department."

"That may be so," says a Senate patent expert, "But it has seldom been used." He points out that the revision is evidence that the military is "taking a closer look at the patent system."

A staff assistant to a congressman who supports government acquisition of all research and development patent rights says: "The revision is the Defense Dept.'s way of taking a small step in our direction."

■ Business Lags On Trade Ideas

The Government is asking U. S. businessmen to express more ideas on the forthcoming trade negotiations with foreign countries. The negotiations, under the General Agreement on Tariffs and Trade, (GATT), will concern import restrictions by other countries for balance of payments reasons.

Meanwhile, the general GATT tariff conference is floundering in Geneva. The GATT countries cannot seem to get the negotiations started. Starting time for talks has been delayed again.

The new invitation to businessmen for their views on imports was put out by the Committee for Reciprocity Information. Written statements should be submitted to the Committee at the Tariff Commission Building, Washington 25, D. C.

■ Kennedy Eases Stand on Agencies

President Kennedy, once calling for White House control of the Federal Regulatory Agencies, appears now to be backing away from Presidential direction of such as the Federal Trade Commission.

Latest word from the President is that Congress has "special responsibilities" in this field. Congress agrees. Congressional leaders are establishing a regular committee on regulatory agencies.

But the President still may have a bombshell to drop on the subject. He will give a message on regulatory agency reorganization to Congress next month.

■ Depreciation Bill Not Likely This Term

President Kennedy will tell the Congress on or about March 27 what tax incentives he wants for American business and industry. And Rep. D. Hale Boggs (D., La.), a senior member of the house ways and means committee, says he will sponsor Mr. Kennedy's new proposal.

What type of tax incentives the chief executive will propose, however, is still undecided.

Hints are that the incentives, whatever they may be, will be a direct reduction from final tax bills, not a deduction from gross income.

It appears now that depreciation reform will not be a part of the President's program. In fact, depreciation reform probably will be put off until next year.

■ Defense Waste Hit by Symington

Sen. Stuart Symington (D., Mo.) is adding fuel to the blaze burning under the Pentagon's procurement system.

Symington says that "many millions of dollars have been wasted" and the "combat capability of our forces has been impaired" because the Pentagon has had no system to stop the Army from buying faulty tanks and other combat vehicles, resulting in waste.

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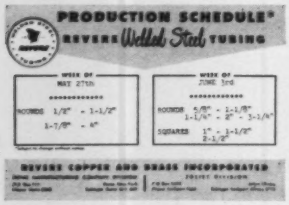

PRODUCTION SCHEDULE*
REVERE Welded Steel TUBING

Shown at left is a sample of the card mailed every two weeks, in advance, showing Revere's Production Schedule. Our customers have found it to be extremely helpful. Shall we place your name on the list? No obligation, of course, and you need not be a Revere customer

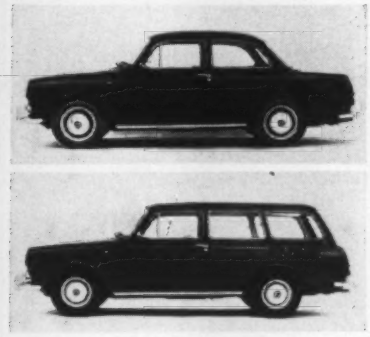
Send today for these two informative booklets: 1 — Revere Welded Steel Tubing Catalog. 2 — Commercial Tolerances for Welded Steel Tubing.

REVERE COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
Rome Manufacturing Company Division
Box 111 Rome, N. Y.

VW Adds New Overseas Line

Volkswagen will be coming out with a new model in September.

The German automaker says the car—VW-1500—will not be sold



VW: Two Big Brothers

in the United States. In an official statement VW says: "The new car is designed for the European market and all American dealers will continue to devote their sales and service facilities to the original model."

U. S. demand for the "old" VW still exceeds supply, according to the automaker.

The new car, six-in. longer and costing 30 pct more, will be displayed for the first time at the Frankfurt Automobile Show. It will be offered in two body styles, a two-door sedan and a two-door station wagon. It has no interchangeable parts with the "small" VW.

No production figures have yet been announced.

Youngstown Drops Belgian Plans

Youngstown Sheet & Tube Co. won't be a partner in the integrated steel mill slated for Ghent Canal, Belgium.

Youngstown President A. S. Glossbrenner says: "Although Youngstown has a continuing interest in foreign steel industry developments, we are not participating in this or any other similar European steel projects at this time."

Company officials say the move was made because of recent developments in the Belgian project.

Britain Moves To Denationalize Steel

England has taken another step toward denationalizing its steel industry. The move came last week when the British government offered the public state-owned debentures and preference stocks of seven United Kingdom steel companies.

Companies involved: Colvilles, Ltd., Consett Iron Co., Ltd., Dorman Long & Co., Steel Co. of Wales, Ltd., United Steel Co., Ltd., John Summers & Sons, Ltd., and Stewarts & Lloyds, Ltd.

Total price of the stocks are $238 million. To encourage public action, the government will provide credit for buyers. Also, the stocks are being offered at rock-bottom prices.

'Small' Automakers Prepare for Spring

With better weather likely to renew auto interest, "small" automakers are preparing.

Italian-made Fiats went on sale in the U. S. last week at reduced prices. The low price and increased warranty is tagged as a "get-acquainted offer." It follows a similar move by other foreign automakers.

France's Pugeot, Inc. is looking for better sales here. Francois Daeschner, executive vice president of Pugeot, says: "We feel that the imported car picture will improve with the economy and spring selling season."

Meanwhile, Ford Motor Co. plans to stop assembly in Copenhagen, Denmark soon. Production there has been limited to Anglia, Consul and Zephyr. Creation of the European Free Trade Assn. and pending reductions in Danish tariffs are the reason.

There are also reports out of London that Ford officials will see the finished Cardinal around early May. European production of the four-cylinder auto is slated for England and West Germany.

McCoy Attacks European Bloc

The president of the Trade Relations Council lashed out at the European Common Market and European Free Trade Area last week.

Horace B. McCoy called the markets "discriminatory and exclusive." The tariff talks at Geneva, he says, mean U. S. negotiators face "the problem of reducing our tariff now in response for concessions which can only come several years hence when other countries' rates will be uniform."

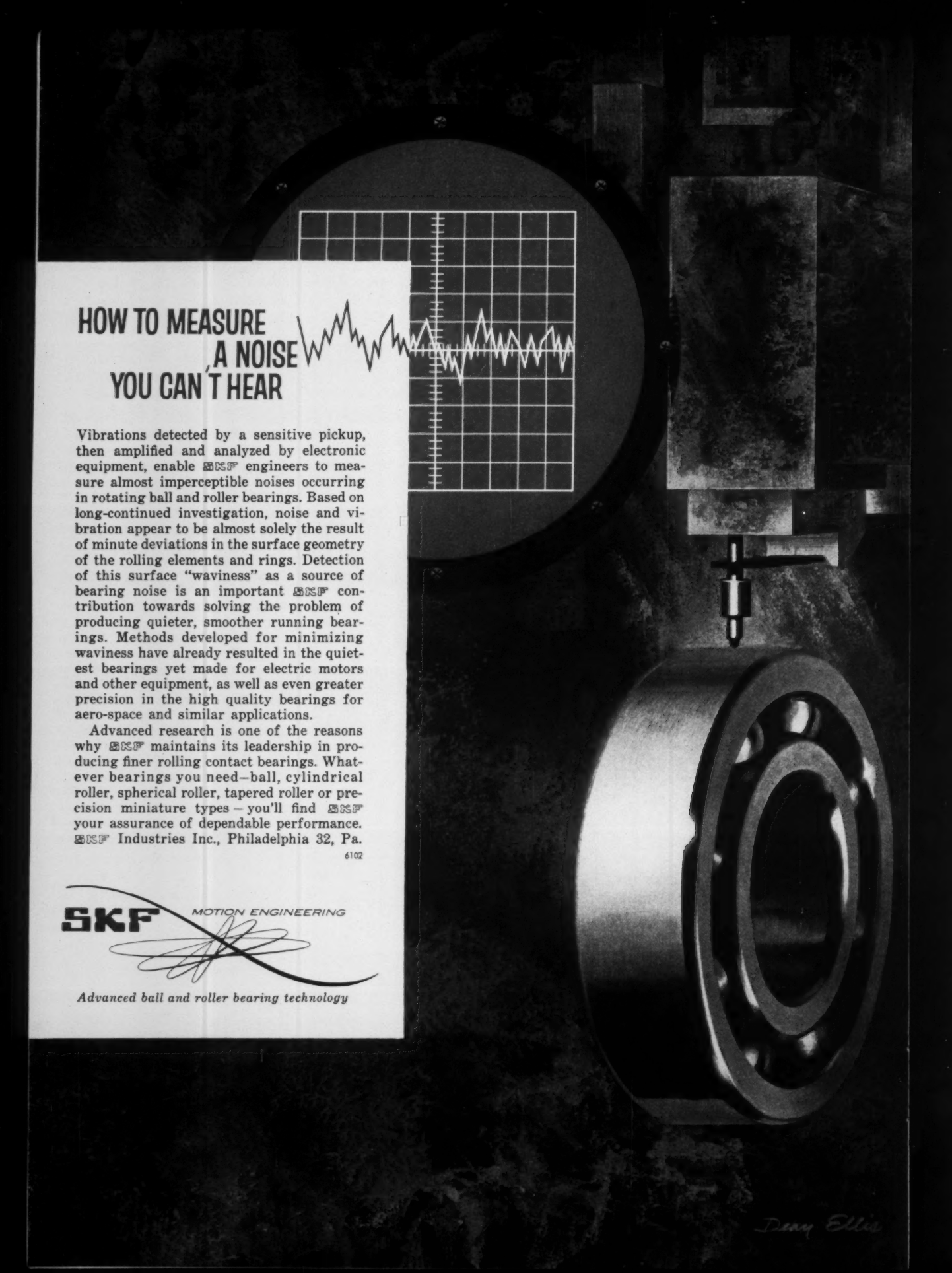
In other words, "The Europeans will be buying now and paying later."

Mr. McCoy also attacked the import relief provisions in the Administration's high priority depressed area proposal.

"We hold it wiser," he said, "to prevent real import injury in the first place."

For Steel Exports

The Development Loan Fund plans to step up loans to India through 1962 to finance U. S. steel exports. DLF officials say money will go for imports of steel. Under loan policy, the steel has to be bought in the U. S.



HOW TO MEASURE A NOISE YOU CAN'T HEAR

Vibrations detected by a sensitive pickup, then amplified and analyzed by electronic equipment, enable SKF engineers to measure almost imperceptible noises occurring in rotating ball and roller bearings. Based on long-continued investigation, noise and vibration appear to be almost solely the result of minute deviations in the surface geometry of the rolling elements and rings. Detection of this surface "waviness" as a source of bearing noise is an important SKF contribution towards solving the problem of producing quieter, smoother running bearings. Methods developed for minimizing waviness have already resulted in the quietest bearings yet made for electric motors and other equipment, as well as even greater precision in the high quality bearings for aero-space and similar applications.

Advanced research is one of the reasons why SKF maintains its leadership in producing finer rolling contact bearings. Whatever bearings you need—ball, cylindrical roller, spherical roller, tapered roller or precision miniature types – you'll find SKF your assurance of dependable performance. SKF Industries Inc., Philadelphia 32, Pa.

6102

SKF MOTION ENGINEERING

Advanced ball and roller bearing technology

Improved Motor Bearings

Teflon reinforced with tin bronze serves as a new material for sliding-thrust and journal bearings in the Soviet Union. This bearing material is made by sintering tin-bronze powder on a steel base; then all pores are impregnated with the Teflon. The newcomer's safe load is almost double that of Babbitt bearings. In addition, the composite material overcomes heavy-starting or working-load friction problems.

Reduces Sintering Time

Japanese researchers are testing semifinished pellets of iron ore. Low-grade iron pyrites are rolled and sintered to ½-in. diam. The resulting pellets are added to a regular sinter mix, as the mix feeds into a standard sintering machine. The Japanese report that this method reduces sintering time and increases furnace yields.

Tailored Alloys

A new and fast-growing concept is to tailor alloys to specific processes. This idea proves especially useful in investment casting. It yields an answer to carbon-pickup problems. Metallurgists claim these custom metals open the door to new design opportunities.

Boosts Magnetic Effects

Hydrogen dissolved in iron steps up iron's magnetism. While hydrogen causes problems in making high-strength steels, it may come into its own in applications where iron-base magnets are needed. Controlled hydrogen content increases magnetic effects by as much as 40-70 pct. Hydrogen-treated iron retains its good magnetic properties at temperatures up to 860°F.

Hard Coat Tool Surfaces

A thermochemical process insures simultaneous penetration of carbon, sulphur and nitrogen into steel and cast-iron surfaces. Surfaces treated in this manner resist wear and sliding friction. This Hungarian sulpho-nitro-cementing process increases the working life of machine tool parts. Uses include piston rings, shafts and pulleys, engine parts, flywheels, valve guides, motor housings and turbine blades.

Programs Tinplate Line

There are many variables that affect product quality in an automatic tinplate line. An electronically-controlled simulator studies all factors and pins down control procedures. It regulates current density, strip temperature, velocity, reflow-cycle and quench times. Thus, the unit saves time in setting up a program.

Abrasive Machining?

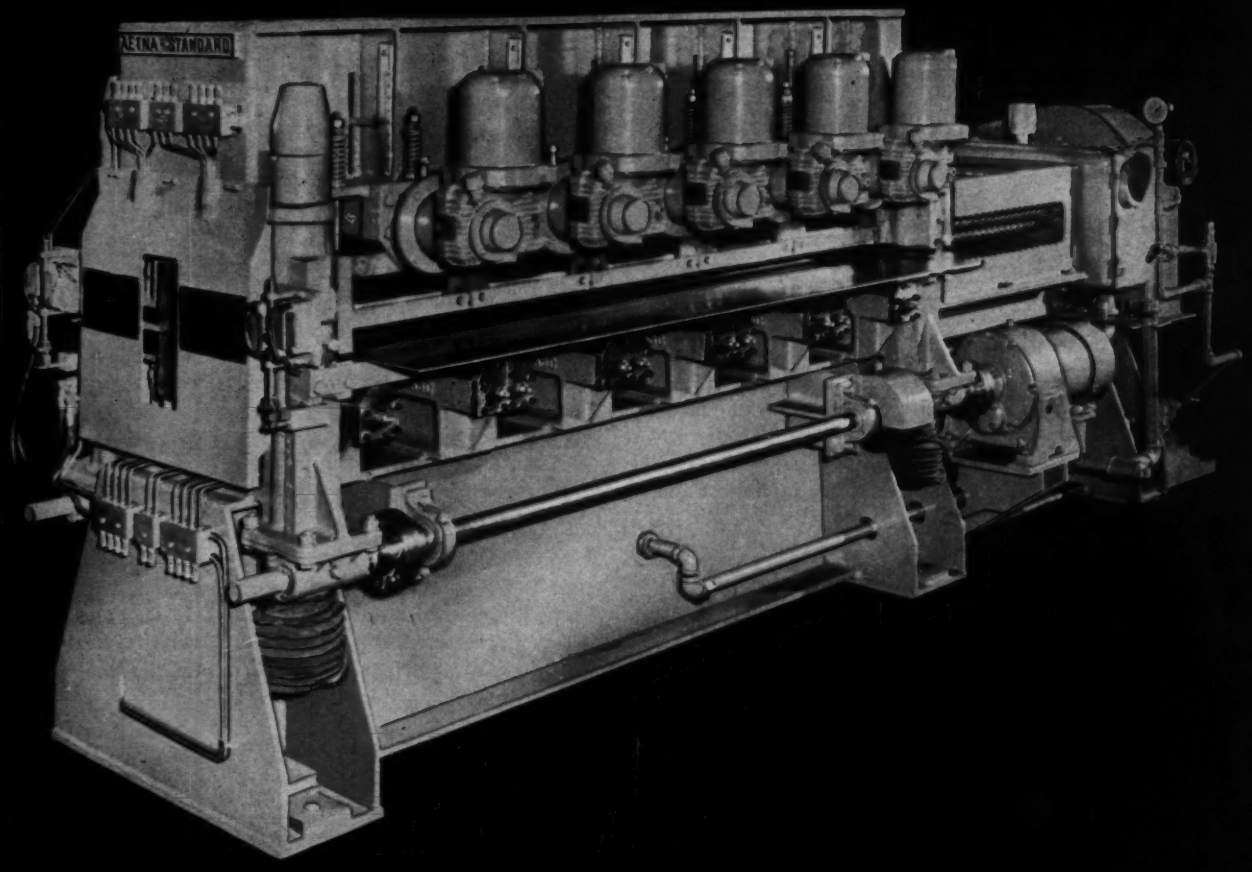
"Just because machining of metal has always been done in a certain way, there is no assurance that traditional methods are the best that can be used," says Norton Co. president, R. F. Gow. Thus, abrasive machining is the subject of an intensive research project now in progress at Norton. Results are expected to show that machining of castings and cut-off steel stock to final-finish dimensions can be economically accomplished entirely with abrasive products.

Plastic Protects Steel

Plastic-clad steel plate, making its debut from the Lukens Steel Co., combines the strength of steel with the protection of plastics. This new product withstands sub-freezing temperatures and heat up to 150°F. It can be rolled into tanks and pressed into shapes. The plates are easily welded. Previously, plastic-coated steels were restricted to thin finished sheets.

Recrystallization Data

New insight into the physical properties of zone-refined metals will result from work now underway at the University of Chicago. An X-ray heat gage is pinpointing precise methods of determining recrystallization heats. Early results indicate that cold-working temperatures affect subsequent recrystallization processes.



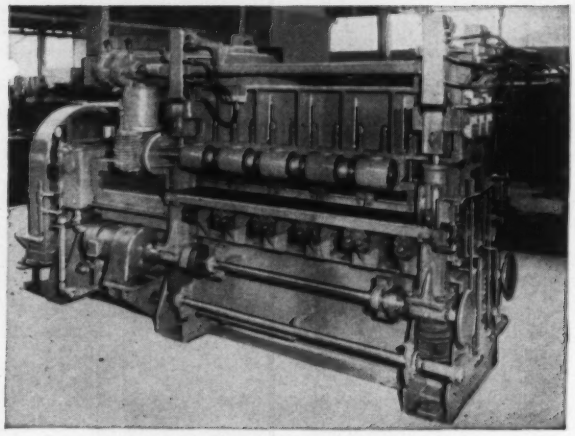
MORE WORK ON PRODUCT MADE POSSIBLE

WITH THIS

NEW ROLLER LEVELER

This new Roller Leveler, designed and manufactured by the Aetna-Standard Division of Blaw-Knox, has individual motor-operated back-up roll adjustments. The operator can easily make quick correction of product shape. The additional sets of back-up rolls make possible more flexibility of adjustment and more thorough working of the product. Motorized adjustments are also included for gauge thickness which make the unit fully equipped with power adjustments.

Leveler illustrated is 1¾" dia. x 72" face—21 rolls. Other sizes can be furnished to suit individual requirements. For detailed information on this new Roller Leveler or other Sheet and Strip Equipment, write: Aetna-Standard Division, Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.



AETNA-STANDARD MAKES MANY TYPES OF LEVELERS

These include 2 and 4 high Roller Levelers, Rectifier Levelers, Heavy Plate Levelers, Roller Levelers for tapered sheets.

Aetna-Standard Division

BLAW-KNOX

A Big Question

Sir—I have admired your editorials for many years and have always thought that if your broad realistic perspective could be adopted by a larger segment of the public, this couldn't help but be a better country. Your February 16 editorial "Double Standards: They Can Cause Anguish," however, left considerable doubt in my mind as to whether or not you had "missed the boat?"

Your editorial jumped rather quickly from "talking about everything but the case involved settles nothing" to the inference that persons handling corporate action must operate according to double standards. Since one of these standards has technically been branded as "illegal action," we are left to assume that it is morally "wrong."

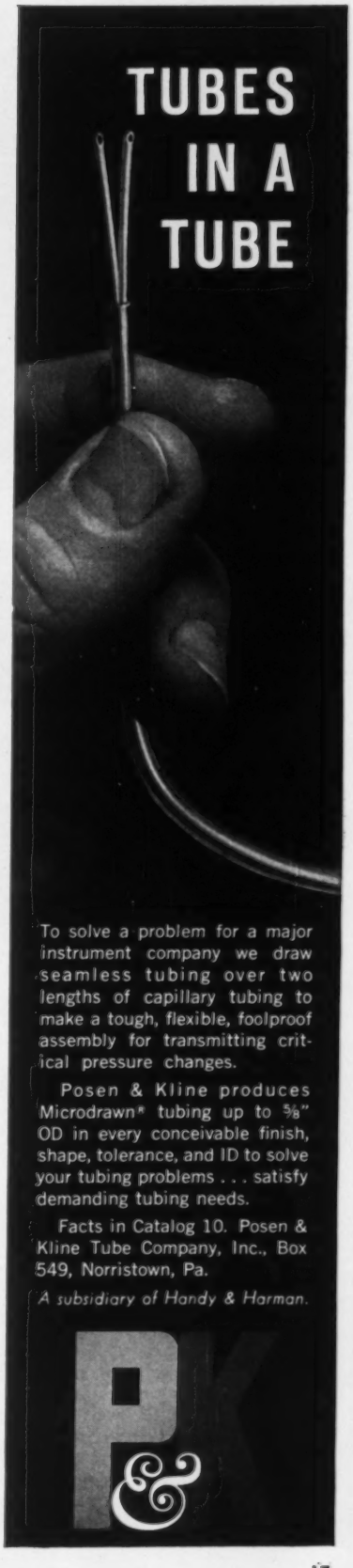
Historically, moral "rights" and "wrongs" have been established by common practice over a broad segment of the population of the world. A recent editorial in The Beaver County (Pa.) Times entitled "Double Standard in Anti-Trust Regulations" indicates to some extent the broad acceptance of "standardization." The question left in my mind, and perhaps in the minds of many others, is why the sudden attack on the electrical equipment manufacturing industry for apparently operating in the same general manner as is acceptable for practically all other activities?

Historically, again, the electrical equipment manufacturing industry certainly hasn't operated in a manner that indicates in the slightest that anyone had been defrauded or that any profiteering has occurred. A quick review of the earnings of this industry indicates that its return or profit is lower than many other industry groups such as oil, food, building products, and even a good portion of the railroad industry. The public has profited from this low earning rate; and in the public utility field — where these charges seem to center—good operation of the utilities and lower cost and better operation of equipment have resulted in major savings for many individuals.

The question that puzzles many of us is why the electrical equipment manufacturing industry, while doing such a good overall job, has been tripped over a legal technicality and severely criticized by the courts, editorials, and news releases with little credit as to its actual economic performance and its many accomplishments for the good of humanity?

Perhaps some further exploration of the question you have asked—"How could upright, solid citizens, with families, community positions of trust, and a professed religious attitude, be involved so deeply in violation of the Federal laws?"—would be in order. Could overall influencing conditions have made their conscience "morally right" but "technically wrong?"—A Westinghouse Electric Corp. employee.

"I'll say one thing for him: He doesn't make snap decisions."


TUBES
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TUBE
To solve a problem for a major instrument company we draw seamless tubing over two lengths of capillary tubing to make a tough, flexible, foolproof assembly for transmitting critical pressure changes.
Posen & Kline produces Microdrawn® tubing up to 5/8" OD in every conceivable finish, shape, tolerance, and ID to solve your tubing problems . . . satisfy demanding tubing needs.
Facts in Catalog 10. Posen & Kline Tube Company, Inc., Box 549, Norristown, Pa.
A subsidiary of Handy & Harman.
P&

Rubber stays dull to keep tin plate shiny

B.F.Goodrich Strip-Grip rolls last longer, reduce slippage

THOSE are tension bridle rolls on a high-speed electrolytic tin plating. line. Their job is to keep a continuous strip of steel moving through the line under controlled tension so that it neither buckles nor stretches too tight.

But for years, these rubber-covered rolls were a terrific headache. After just a few hours, the rubber was polished smooth and shiny with rubbing plus high speed. Then the rolls couldn't grip, the steel smeared and couldn't be used for tin cans.

B.F.Goodrich engineers worked on the problem, and came up with a new, improved rubber compound. Rolls covered with this special rubber don't glaze, don't slip, don't mar the finish of the plate.

At the steel mill shown above, B.F.Goodrich Strip-Grip rolls last 100 per cent longer than the rolls previously used. The appearance of the tin plate has been consistently good.

Maintenance costs have gone way down, too. That's because the roll cover keeps its dull finish permanently. Strip-Grip rolls have operated for periods of three or four months, without maintenance of any kind, in mills where conventional rolls needed almost daily attention.

B.F.Goodrich distributors have full information on the steel mill rolls described here. And, as factory-trained specialists in rubber products, they can answer your questions about the many products BFG makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-983, Akron 18, Ohio.*

B.F.Goodrich

RUBBER-COVERED ROLLS

Many Thanks

In a recent article, entitled "Forecast Scrap Loss in Machining" (IA, p. 116, Feb. 16), we inadvertently failed to credit the source. Our many thanks go to A. A. Kunzenbacher and R. A. Rage of the Hyatt Div., General Motors Corp. We're always happy to receive technical reports which reflect improvements in the metalworking field.

Paul Wooton Dies

We were saddened by the recent death of Paul Wooton, Washington representative on the editorial board of Chilton Co., publishers of IRON AGE.

Paul, one of the country's best known, liked, and respected correspondents, died suddenly on Feb. 16.

Friend In Need—His loss was particularly sharp to the entire Chilton Co. and to the many IRON AGE staff people who knew and respected the man who served on Chilton's Editorial Board for more than 15 years and who was always eager to be of help.

Paul died and was buried in Washington.

Scores of the great from the fields of politics, government, the press and the diplomatic corps were among the mourners at his funeral. It was those of the press who paid special tribute, however, to the man who had worked among them and served them for 46 years.

Tribute From JFK — President Kennedy, the sixth President to know Paul on a first-name basis, said upon hearing of his death that he was "extremely saddened" and eulogized Paul as a "distinguished journalist who contributed much to his profession and his country."

In a lifetime spanning almost 80 years, Paul rose from a telegrapher and schoolteacher to earn almost every honor possible for his service to journalism.

Promoted Business Press — He was generally credited with being the major force in gaining recognition and deserved prestige for the business press in official Washington through his friendship with President Herbert Hoover in the late 1920s. He was a co-founder of the Society of Business Magazine Editors, a former president of the group, and at the time of his death its executive vice president.

Paul Wooton

Paul had been President of the National Press Club, the Gridiron Club, the Overseas Writers, and the White House Correspondents Association.

Busy Last Day—He had also been president of the Business Paper Correspondents, the National Conference of Business Editors, the Louisiana Society of Washington, the Washington Society of Engineers, and was a member of Sigma Delta Chi, the national honorary journalism fraternity.

Paul continued serving his profession until the end. At the time of his death, he was busy arranging for the annual stag dinner in honor of the President.

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the sling chain with everything

- high resistance to impact loading
- maximum safety for overhead lifting
- lighter weight for easier handling
- long life on toughest jobs

FIRST TO BE TESTED, REGISTERED AND GUARANTEED. A Certificate of test including guarantee is issued for each new Herc-Alloy Sling Chain shipped from our factory. A metal registration tag is permanently attached bearing the serial number which is recorded in our engineering files with full details about your chain.

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Herc-Alloy is the original alloy steel chain...is heat treated by a special process... is electrically welded by exclusive Inswell time-tested method. All attachments are alloy steel including those to your specifications which are forged in our own shop. Specify Herc-Alloy for the best of everything in sling chains.

CHAIN SAFETY PROGRAM literature and assistance available.

SEND FOR helpful Data Book on Herc-Alloy sling chain selection, care, use and inspection.

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PREDICT PERFORMANCE with ... FRASSE "CONTROLLED QUALITY" STEEL BARS

"Controlled Quality" is the valuable extra you get in every bar of carbon and alloy steel shipped by Frasse. It results from rigid inspection practices through every step of production . . . tight adherence to "specs" . . . and careful handling, storing and shipping methods to protect straightness and surface finish.

The advantages of Frasse "Controlled Quality" are yours—in *uniform* results from bar to bar . . . shipment after shipment. It assures predictable performance from the steel you use . . . before you use it. You get exactly what you pay for, every *time*.

Since 1816—when Frasse first began serving steel users, its reputation for product reliability has been unsurpassed. That's why Frasse is a leading source for carbon bars and shafting—as well as commercial and aircraft quality alloy steels.

Frasse stocks an unusually complete range of sizes and grades—quick deliveries are routine. If you insist on top quality—want it fast . . . make it a point to call Frasse. Thousands of leading firms do . . . to their complete satisfaction.

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Carbon and Alloy Steels

Frasse Stocks Include:

C1018	C1141	E4130
C1045	C1212	4130 H.T.
B1112	C1213	4140
B1113	Ledloy	4142
B1113X	4615	4142 H.T.
C1117	8620	E4340
C1137	E9310	E8740

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COMING EXHIBITS

Western Metal Show — March 20-24, Pan Pacific Auditorium, Los Angeles. (American Society for Metals, Metals Park, Novelty, O.)

National Packaging Show — April 10-13, Lakefront Exposition Hall, Chicago. (American Management Assn., 1515 Broadway, Times Square, New York 36.)

Welding Show — April 17-21, New York Coliseum, New York. (The American Welding Society, 33 West 39th St., New York 18.)

Powder Metallurgy Show — April 24-26, Hotel Sheraton - Cleveland, Cleveland. (Metal Powder Industries Federation, 60 E. 42nd St., New York.)

Castings Show—May 8-12, Brooks Hall, San Francisco, Calif. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Design Engineering Show — May 22-25, Cobo Hall, Detroit. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

MEETINGS

MARCH

Steel Founders' Society of America — Annual meeting, Mar. 11-14, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.

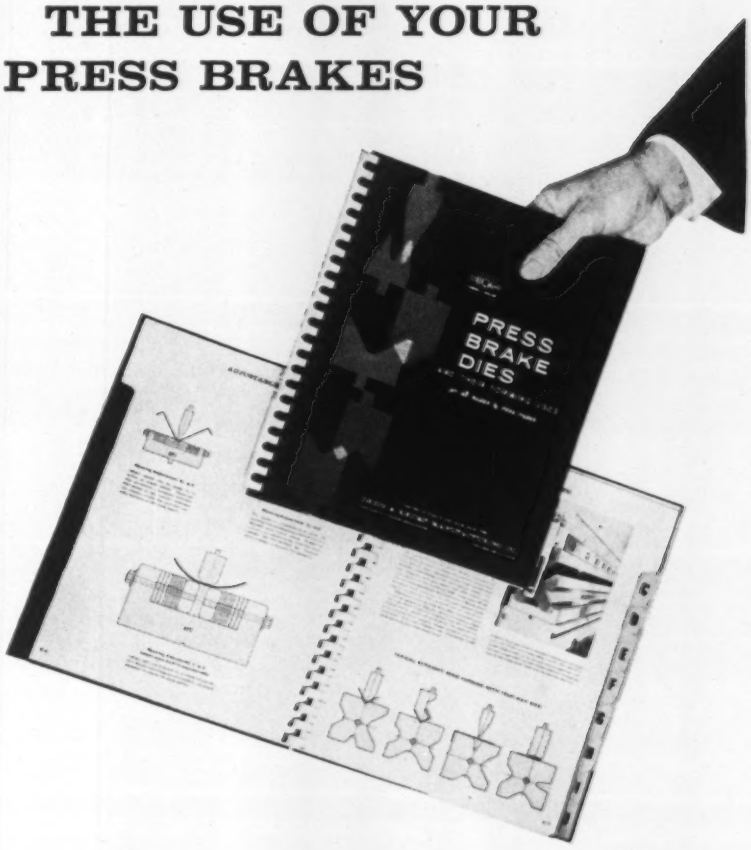
Industrial Diamond Assn. of America, Inc.—Annual meeting and convention, Mar. 13-17, Hollywood Beach Hotel, Hollywood, Fla. Association headquarters, Box 175, Pompton Plains, N. J.

Society for Non-Destructive Testing — Western regional convention, Mar. 20-24, Ambassador Hotel, Los Angeles. Society headquarters, 1109 Hinman St., Evanston, Ill.

American Hot Dip Galvanizers Assn., Inc.—Annual meeting, Mar. 22-24, The Royal Orleans, New Orleans. Association headquarters,

(Continued on P. 23)

HOW TO EXPAND THE USE OF YOUR PRESS BRAKES



the blue book of press brake tooling

This new book is the most comprehensive treatise on press brake work—134 pages of ideas. It is offered to assist press brake users visualize methods suitable to their own bending and forming needs.

To develop any of these ideas to your particular type of work, on any make of press brake, the Tooling Division at Dreis & Krump offers you top, experienced designers and a large die shop well equipped to make the finest press brake dies of any type, any size, at lowest cost.

This book, Press Brake Dies, is available to any press brake user by request on company letterhead.

9757

A Tradition of Quality and Value since 1899

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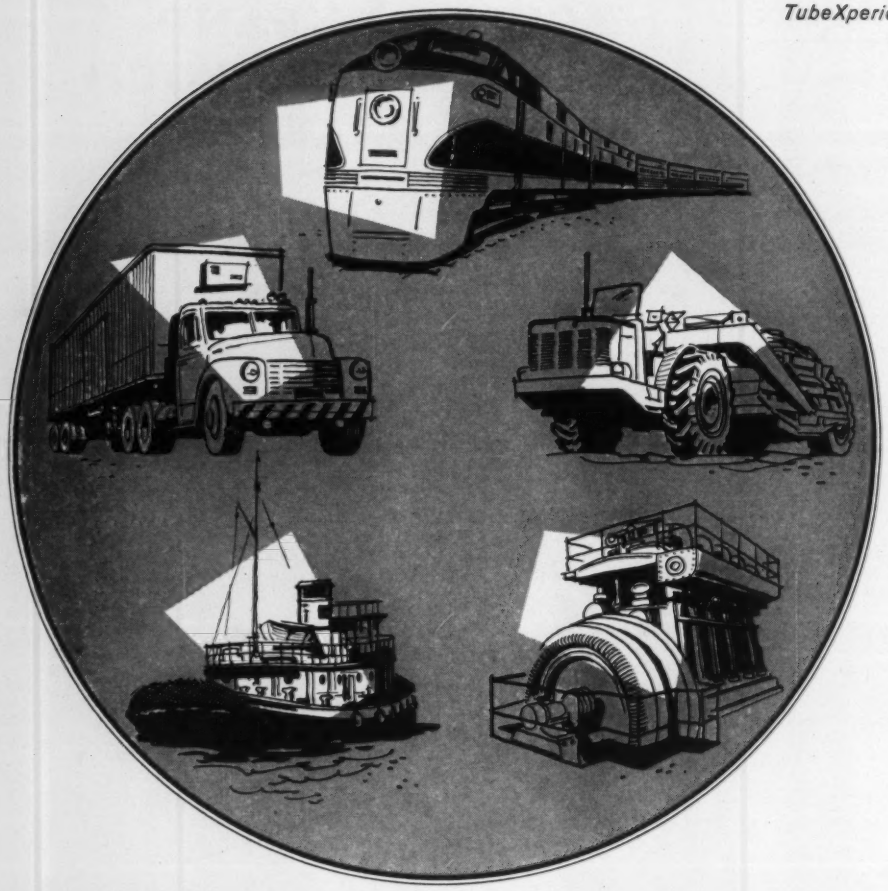
Hand and Power Bending Brakes
Special Metal-Forming Machines

CHICAGO DREIS & KRUMP

DREIS & KRUMP MANUFACTURING CO.
7430 S. Loomis Blvd., Chicago 36, Illinois



Feedlines for hungry horsepower . . . diesel fuel injection tubing by Superior

Fuel injection systems are the heart of thousands of diesel-powered trucks, locomotives, roadbuilding equipment, electric generators, and marine power plants. The tubing that conveys the fuel from injection pump to nozzle assembly is an important component. It must resist the stresses of pressure and vibration, yet be ductile enough to be cold swaged and upset and be cold formed into loops and bends without excessive springback. It must have a clean ID, tremendous burst strength, and high fatigue resistance. Superior diesel fuel injection tubing is just such a premium product.

Type C-1008 and Type MT-1010 carbon steel tubing are most commonly specified for this application, but alloy and stainless steel tubing for pressures above 9000 psi and greater corrosion resistance is available. Superior also makes tubing for many other applications—supplies both general and special purpose tubing for aircraft, missiles, electrical, electronic, chemical, hydraulic, dairy and nuclear, to name a few. For complete information, write Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

SOME REASONS WHY SUPERIOR FUEL INJECTION TUBING IS A PREMIUM PRODUCT

- It will handle pressures to 9000 psi, is hydrostatically tested to various pressures according to specification
- It is cold drawn, dead soft annealed, and seamless
- It is ID conditioned to remove fissures and other defects
- It is free from ID radial cracks deeper than .005 in. or 5% of wall thickness, whichever is less
- It is annealed at finish in controlled atmosphere furnaces to produce a soft, ductile and scalefree material
- Fracture tests are performed when requested

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to 5/8 in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST

MEETINGS

(Continued from P. 21)

5225 Manning Place, N. W., Washington, D. C.

Pressed Metal Institute — Spring technical meeting, Mar. 22-24, New York. Institute headquarters, 3673 Lee Rd., Cleveland.

Air Moving and Conditioning Assn., Inc.—Mid-year meeting, Mar. 22-24, Whittier Hotel, Detroit. Association headquarters, 2159 Guardian Bldg., Detroit.

American Machine Tool Distributors Assn. — Spring meeting, Mar. 23-25, Hotel Mark Hopkins, San Francisco. Association headquarters, 1500 Massachusetts Ave., N. W., Washington, D. C.

APRIL

The Metallurgical Society of AIME —National Openhearth Steel Conference, Apr. 10-12, Sheraton Hotel, Philadelphia. Society headquarters, 29 West 39th St., New York.

American Institute of Electrical Engineers — Biennial conferences on electric heating, Apr. 11-12, Sheraton-Lincoln Hotel, Indianapolis, Ind. Institute headquarters, 33 W. 39th St., New York.

Steel Shipping Container Institute, Inc.—Annual meeting, Apr. 11-13, Kenilworth Hotel, Miami Beach, Fla. Institute headquarters, 600 Fifth Ave., New York.

American Society of Lubrication Engineers — Annual meeting and exhibit, Apr. 11-13, Bellevue-Stratford, Philadelphia. Society headquarters, 5 North Wabash Ave., Chicago.

Copper & Brass Warehouse Assn., Inc.—Annual meeting, Apr. 11-14, Colorado Springs, Colo. Association headquarters, 1900 Arch St., Philadelphia.

Rail Steel Bar Assn. — Annual meeting, Apr. 17-18, Biltmore Hotel, New York. Association headquarters, 38 South Dearborn St., Chicago.

BY THE TIME YOU FINISH YOUR SMOKE

Step into any plant equipped with a Danly Quick Die Change Press —and watch! You'll see the Q.D.C. change dies in less time than a cigarette takes. As one self-propelled bolster assembly rolls the old die out of the press, another one rolls the new die in. And the press goes right back into production on a new part. Think of the hours of profitable production you'll gain with this time-saving Danly development. Think of the efficiency you'll get on short-run production. And while you're thinking about it, decide right now to find out more about the Danly Q.D.C. Press.

DANLY®

BULLETIN Q.D.C.-1 Tells how the Danly Quick Die Change Press can drastically reduce your die change downtime. Write for your copy.

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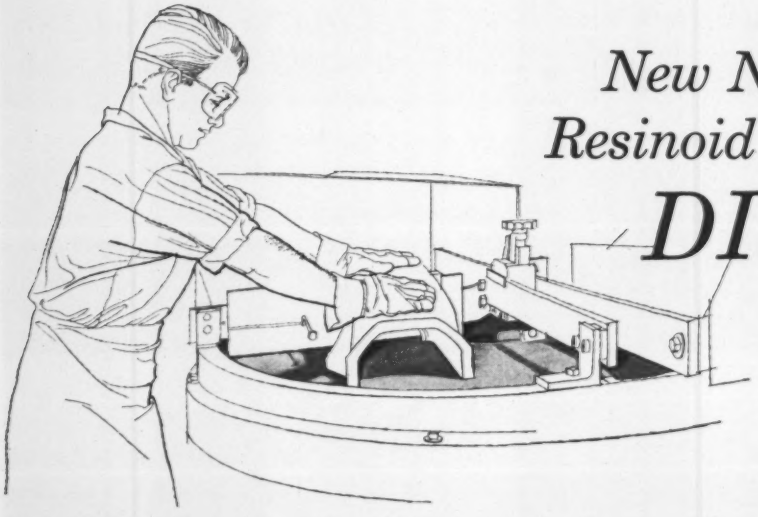
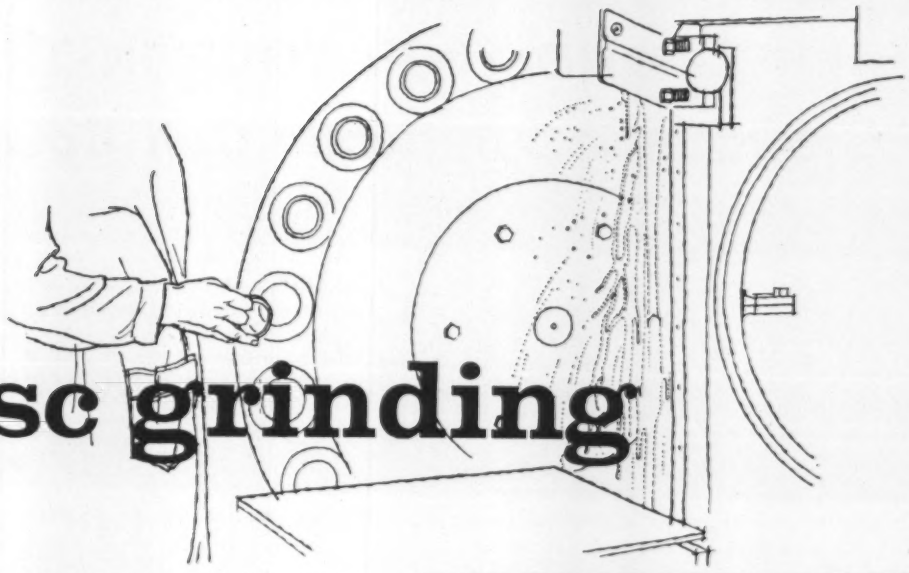
B14



New Norton Resinoid Bonded

DISCS



disc grinding

Throughout the country plant after plant is showing real enthusiasm for the new economy — and profits — the Norton-developed B14 resinoid bond has brought to the finest disc wheels ever made.

Development of the new B14 bond involved not only improvements in bond material but entirely new processing.

It took several years to perfect these changes. It also took many months to complete nationwide testing of the new B14 discs, on all types of disc grinders — horizontal or vertical spindle, single or double — on jobs ranging from snagging to precision finishing, and on ferrous, nonferrous and non-metallic materials. Also, the tests were entirely comparative — not only against competitive wheels but against Norton discs which were then standard.

Results of this across-the-board testing are outstanding. The new B14 discs have proved beyond question their ability to grind more workpieces per disc . . . faster and better, with fewer dressings . . . and with constant uniformity throughout extra long disc life.

Let new B14 discs bring you proof of better lower cost surfacing. Have your Norton Man, a trained abrasive specialist, study your requirements and make trial runs of the B14's you need — solid discs or segmental, ALUNDUM* or CRYSTOLON* abrasive. Or get details from your Norton Distributor. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries

A few of very many reports from Norton customers . . .
PROVING B14 DISCS THE BEST

JOB: Rough grinding iron castings, 3½" x 2½".

REPORT: **B14 37 CRYSTOLON wheel ground 6,000 parts with one dressing. Best previous disc gave 4,500 parts with 4 dressings.**

JOB: Surfacing cold rolled steel washers on double disc machine.

REPORT: **B14 19 ALUNDUM discs impressive as best so far, with very even wear.**

JOB: Through-feed grinding of 52,100 steel bearing races.

REPORT: **B14 ALUNDUM disc very free cutting, clean and cool. Longer life than previously used Norton disc.**

JOB: Double-disc grinding Alnico magnets.

REPORT: **B14 mixed-abrasive wheel thoroughly approved for new orders.**

JOB: Double-disc grinding abrasive sticks.

REPORT: **B14 37 CRYSTOLON disc gave improved rate of cut. More abrasive sticks per disc-dressing.**

JOB: Rough grinding miscellaneous parts on double end machine.

REPORT: **B14 44 ALUNDUM disc performed better, lasted longer than all types.**

NORTON
ABRASIVES

W-2009

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

SURE PROTECTION FOR YOUR IN-TRANSIT STEEL ORDERS . . . *Republic Coil Covers*

Specify Republic Coil Covers for your rail-shipped steel orders, and you get three important advantages. Because your order arrives clean and undamaged:

YOUR FINISHED PRODUCT QUALITY IS BETTER, unnecessary steel preparation and finishing costs are eliminated;

CLAIMS HEADACHES ARE REDUCED, as are the time, trouble, and delay of replacing damaged stock.

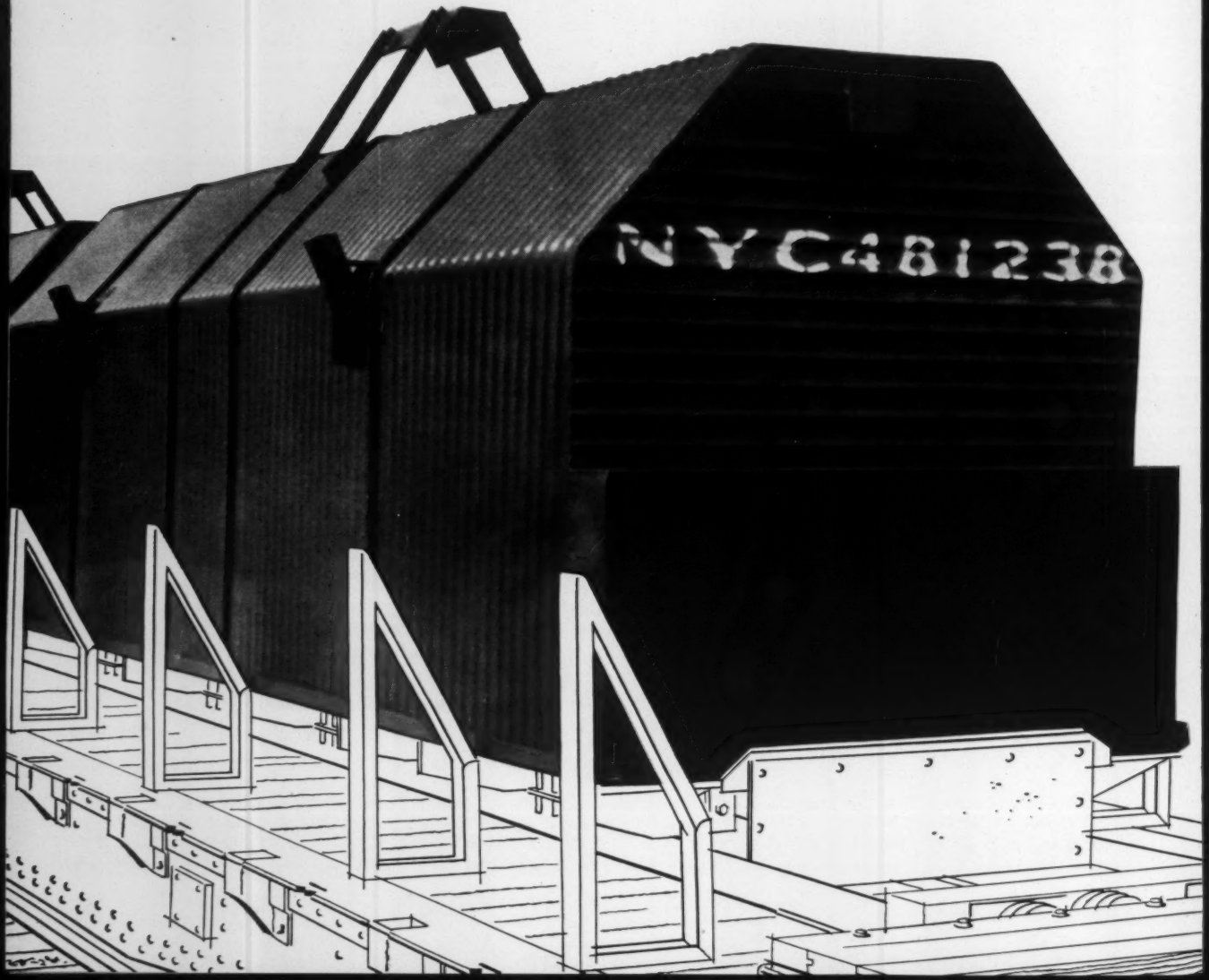
Republic Coil Covers are designed so they can be easily handled by overhead or track-side cranes, and readily tiered during loading and unloading;

SHIPMENTS ARE FASTER because freight handling is simplified; no hand stretching of tarpaulins or other covering material.

Ask your shipper to protect your orders with Republic Coil Covers. And, for specifications and data on advantages of Republic Coil Covers for your in-plant rail system, send the coupon.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products



CONTRACT MANUFACTURING SPECIALISTS. From design, through engineering and fabrication, rely on Republic for contract production of sheet steel products of all kinds. Complete facilities, including modern machine shop, assembly, Bonderizing, and painting lines. Republic can handle your complete job (or any phase of it) . . . often at considerable savings to you. Send coupon for information.

REPUBLIC STEEL LOCKERS give change, wash, and dress centers a new look, protect employee valuables and tools. Available with popular locking devices. Handles attached with tamper-free Gulmite screws and lockwashers. Bonderizing protects against rust and corrosion, reduces maintenance costs. Republic will help you with locker planning, and assume full responsibility for installation. Send for data.

REPLACE ORDINARY BUILDING MATERIALS with Republic METAL LUMBER for stronger, safer framing. Ideal for dozens of applications. Simply measure, cut, and assemble. Slotted angle pattern speeds erection, reduces time and material costs. Available in two gages, two widths . . . standard bundles of 10- or 12-foot lengths. Send for brochure.

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Please send more information on the following products:

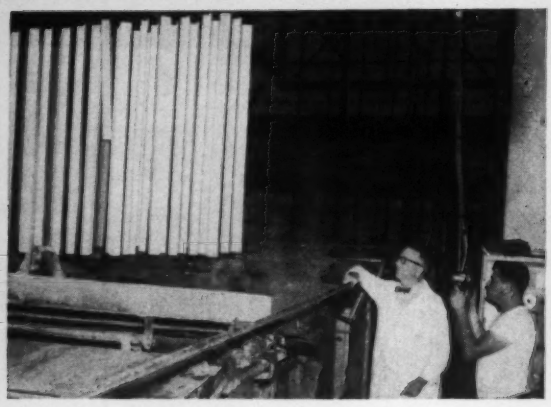
- ☐ Republic Coil Covers
- ☐ Republic Steel Lockers
- ☐ Republic Berger Division Sheet Steel Contract Facilities
- ☐ Republic METAL LUMBER®

Name_____ Title_____

Firm_____

Address_____

City_____ Zone_____ State_____



"FULL-LINE" ECONOMY IN METAL PROCESSING

Chemicals • Equipment • Service

When you use Pennsalt metal processing chemicals, you gain the built-in savings of a complete line that assures you of getting the material exactly suited to each job, at the lowest cost.

Over 40 types of cleaners for all metals . . . a full range of etchants and brighteners . . . descaling and pickling compounds . . . Fosbond® phosphate coatings . . . Foscoat® and Foslube® cold-forming lubricants . . . Drawcote® deep-drawing lubricants . . . paint strippers . . . strippable vinyl coatings. All quality controlled, readily available . . . because Pennsalt makes its own alkalies and other basic materials.

The Pennsalt System Approach treats your metal finishing line as an integrated system . . . makes chemicals and equipment work together for high-speed production, product quality, lower costs. Key to this approach is personalized service by Pennsalt's nation-wide organization of trained specialists. Our men analyze your process requirements, design processing lines, aid in installation and start-up. And even more important, they make regular service calls to keep your finishing line running efficiently month after month.

Call or write today for a consultation. And write for free booklet "The Pennsalt Metal Preparation Service Plan."

. . . a better start for your finish®

METAL PROCESSING DEPARTMENT

PENNSALT CHEMICALS CORPORATION

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Pennsalt Chemicals ®
ESTABLISHED 1850

Pennsalt Chemicals of Canada Ltd., Oakville, Ontario • Industrial Química Pennsalt, Mexico City

The nearsighted MISTER MAGOO says . . . "1956? A banner year! Princess Grace was married—unfortunately I couldn't attend—and General Electric invented the Power Groove Lamp. Happy birthday, Power Groo—Bowser! drop that salami! You've taken enough bites out of it already!"

© UPA PICTURES, INC.

G-EXCLUSIVE! Power Groove® cuts your initial costs as much as 40¢ a sq. ft.

General Electric Power Groove Lamps start saving you money the day you specify them.

By any standard of comparison, they give you more light—with fewer lamps—than any other fluorescent type or brand. If you're building or remodeling, Power Groove Lamps *can save you up to 40¢ per square foot of lighted floor area* right off the bat.

Just the beginning. With fewer lamps, fixtures and ballasts overhead, your maintenance men spend less time on ladders.

Your employees' increased efficiency helps pay for Power Groove Lamps. If every reject makes you wince, consider how improved lighting—at no extra cost—might spruce up your operation. Perhaps you can remove the individual lamps that light only machines or tables.

General Electric's 5-year-old secret is in the grooves. They bend a 9-ft. arc stream through an 8-ft. tube and swing it closer to the light-producing phosphor coating. No other fluorescent lamp compares with the Power Groove. Call your General Electric Lamp distributor when *you* need lamps. General Electric Co., Large Lamp Dept. C-14, Nela Park, Cleveland 12, O.

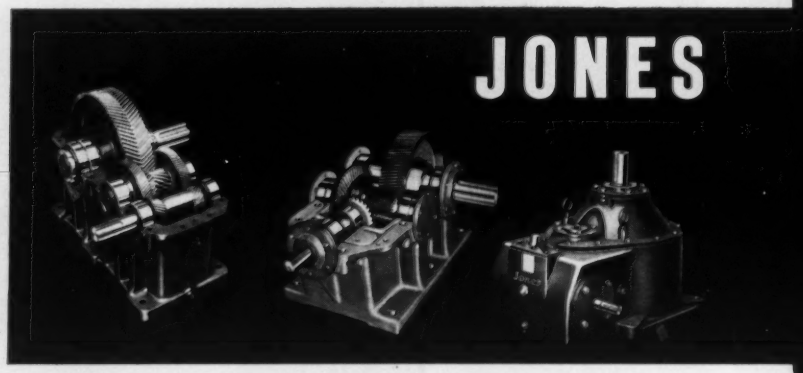
Progress Is Our Most Important Product

GENERAL ELECTRIC

How

THE BROAD H-R LINE

can pinpoint your needs, save you time and give you off-the-shelf savings.



Jones herringbone reducers...

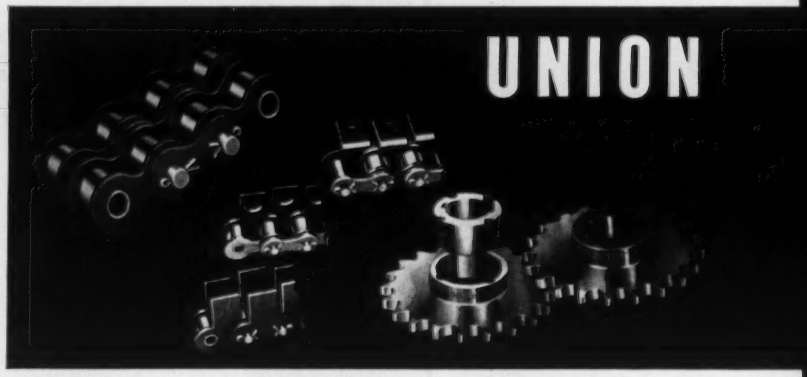
Ruggedness and reliability, known throughout industry. Widest selection of sizes and ratios. Balanced design, rugged housing, heavy-duty bearings mean efficient, trouble-free operation, and longer life. Capacities to 1,672 hp. *Bulletin J-100.*

Jones spiral bevel speed reducers...

Most-up-to-date design. Horizontal or vertical outputs. New, highly efficient right angle drives. Matched sets of high-hardness spiral bevel gearing, oversize bearings, alloy steel helical gearing. Capacities to 1,050 hp. *Bulletin J-25.*

Jones worm helical speed reducers...

Heavy duty service. Applicable to a wide range of vertical drive requirements where medium to high speed reduction ratios are needed. Available in low speed shaft extension up, down, and double extended. Capacities to 175 hp. *Bulletin J-14.*



Union ASA standard roller chain...

Over 98% efficient. Union ASA standard roller chain transmits more horsepower in less space than many other mechanisms. Available in outstanding range of pitches and widths, ASA standard and ASA heavy series, and extended pitch. *Bulletin RT-60.*

Roller chain attachments...

An almost unlimited variety of unusual drive and conveying problems can be solved with standard or special attachments by Union Chain. *Bulletin RT-60.*

Union roller chain sprockets...

Complete range of stock and special sprockets for all chain applications. Precision teeth, tough, durable body, proper tooth surface hardness make for long life and economy. Available also in Taper-Lock bushings. *Bulletin RT-60.*

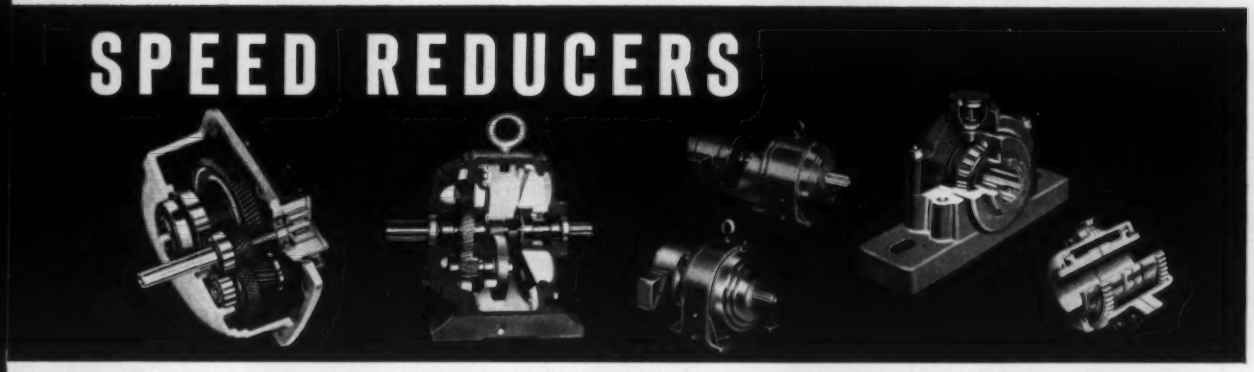
YOUR H-R POWER TRANSMISSION SPECIALIST CAN SHOW YOU HOW...

to select the ratio, capacity, and design closest to your needs . . . directly from H-R standard equipment . . . and at "off-the-shelf" savings.

Another point in your favor: your H-R power transmission specialist is in the best position to help you select the right drive. He can recommend without bias, because the H-R line is one of the most comprehensive in industry. Experienced in *all* phases of power transmission, he can be invaluable in helping you with your over-all drive problem. Important too, he has Hewitt-Robins service and reliability behind him!

Availability? H-R warehouses, sales offices, and stock-carrying distributors spread a strategic network from Coast to Coast. There is a team of H-R

SPEED REDUCERS



Jones shaft-mounted reducers...

Compact design for confined areas. High hardness gearing for long life. Double lip oil seals, anti-friction bearings, automatic overload mechanism, positive lubrication. Torque-arm for simple belt tensioning adjustment. Capacities to 40 hp. *Bulletin J-19.*

Jones in-line helical reducers...

Standardized components, both in-line and right angle reducers to meet any drive requirement. Easy-to-change ratios. One-piece, cast housing, positive gear and shaft alignment, reliable oil-sealing. Capacities to 147 hp. *Bulletin J-18.*

Jones gearmotors...

Horizontal or vertical, flange or foot-mounted. Two basic types: *All-motor* . . . has motor mounting bracket for foot-mounted motor. *Integral* . . . incorporates flange-type motor bolted directly to gearhead housing. *Bulletin J-17.*

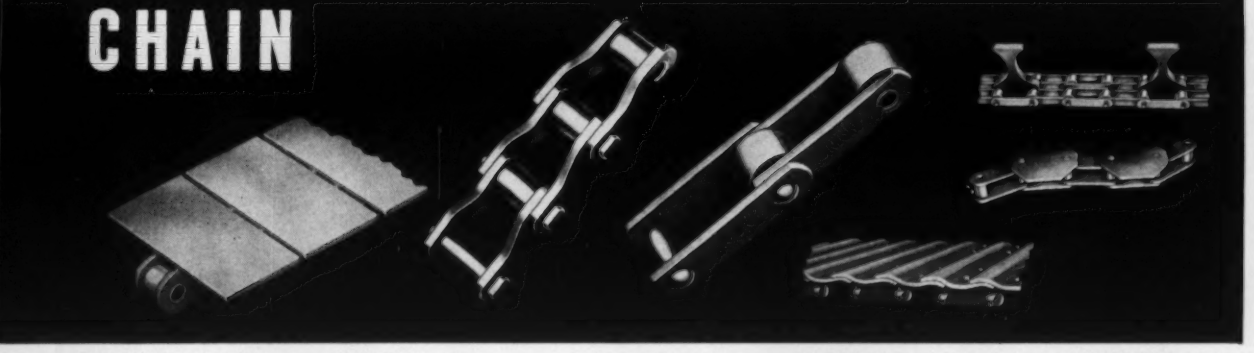
Jones power transmission components...

Pillow blocks for heavy-duty service. Timken tapered roller bearings, two-piece, cast iron housing, shaft sizes from 1 15/16" to 9". *Flexible couplings*, gear tooth, fabric disc . . . *V-belt drives . . . cut tooth gears . . . cast iron pulleys. Bulletins J-10A, J-16, J-23.*

Jones complete drive units...

Safe, efficient special drives, feeder tables, car pullers, door, boom, and skip hoists. Feature rugged reliability of Jones speed reducers. Standard lines available or modifications of existing equipment at considerable savings. *Bulletins J-11, J-22.*

CHAIN



Union ASA standard flat top roller chain...

Now available in Delrin, (as well as other materials) reduces breakage and eliminates corrosion problems in many food, beverage, and pharmaceutical conveyor applications. Available in many combinations of chain and materials. *Bulletin RT-60.*

Union HB steel drive chain...

At home in heavy duty service, such as cement mixers, cranes, shovels. Offset side-bar adds to flexibility. Hardened bearing for rugged wear. Pitches from 1.6" to 6.0". Average ultimate tensile as high as 420,000 psi! *Bulletin A-4.*

Union HB steel roller chain...

Low ultimate cost in all types of elevating and conveying duty. Hardened alloy steel bushings, uniform wearing surfaces, true pitch accuracy, tight fit of pins and bushings. *Bulletin A-4.*

Union apron conveyors...

Many types available. Union apron conveyors for bulk or packaged materials. *Bulletin A-4.*

Union "Made-to-order" chain...

Meet unusual requirements. Union Chain Division of Hewitt-Robins, unlike many manufacturers, is able to design and produce special chains to meet special needs. *Bulletin A-4.*

power transmission specialists in your territory. To put them to work for you, just give your nearest Hewitt-Robins Sales Office a call.

HR HEWITT-ROBINS

CONVEYOR MACHINERY AND BELTING • HOSE
POWER TRANSMISSION • VIBRATING EQUIPMENT
ENGINEERING SERVICES

WRITE FOR TECHNICAL BULLETINS

HEWITT-ROBINS
DEPT. 3-62, STAMFORD, CONNECTICUT

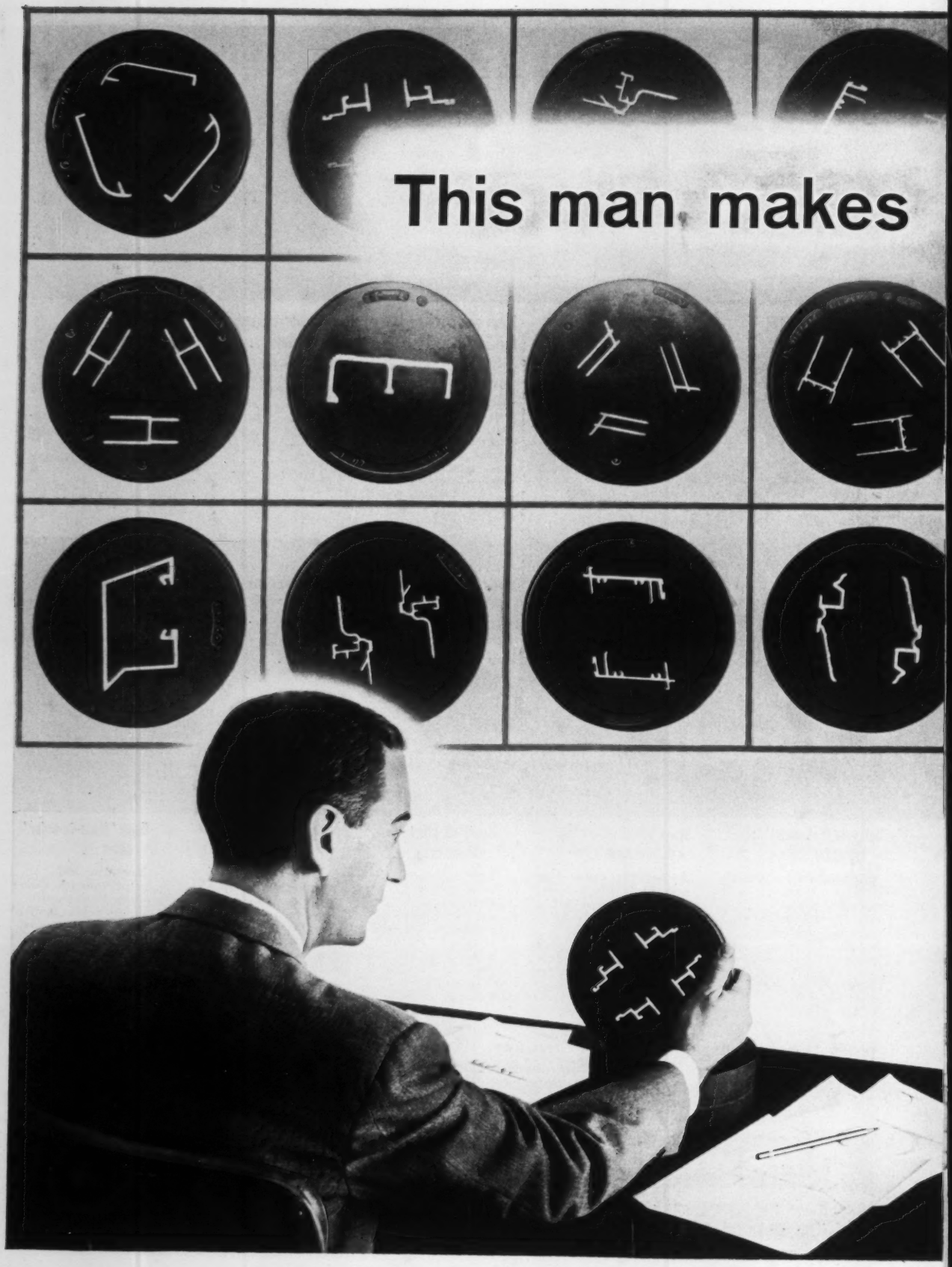
Gentlemen:
Please send me the following bulletins:

☐ J-10A ☐ J-11 J-22 ☐ J-14 ☐ J-16 J-23 ☐ J-17 ☐ J-18 ☐ J-19 ☐ J-25 ☐ J-100 ☐ RT-60 ☐ A-4

Signed_____ Title_____

Company_____

Address_____


This man makes

aluminum extrusions in any shape you need!

He's your nearby independent extruder... Supplied with quality ALCAN aluminum by Aluminium Limited

Like so many manufacturers, you may find your best source of precision-made aluminum extrusions is local . . . an independent extruder near your plant!

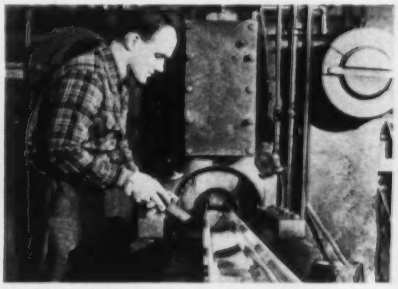
A specialist in aluminum and in the extrusion process, he can be a big help in engineering and design . . . producing the precision-made parts you need to your most exacting requirements. As for alloys, he offers you a wide range of aluminum alloys formulated by Aluminium Limited for specific end-product requirements.

Your nearby extruder also offers more attentive, more personalized service. Even on your smallest order, he gives you the quality, delivery and unit cost that assure your repeat business.

Call in your aluminum extruder on your next semi-fab order. Let him estimate on cost and delivery. Or, if you prefer, we'll be pleased to send you a list of leading extruders in your area.

Fast, reliable delivery. Because he's nearer to your plant, your aluminum extruder can arrange production schedules to suit your needs. He can also work more closely with you in estimating, planning and engineering.

Design help. Your nearby aluminum extruder is an aluminum specialist. Years of experience qualify him to help you develop the semi-fabricated aluminum shape best suited to economical fabrication and efficient performance of your product.



Modern equipment. Investigate the facilities offered by your aluminum fabricator—you'll find him well equipped to serve you. His facilities, experience, location, and his personalized service make him your best source of semi-fabricated aluminum products.

Aluminium Limited

ALCAN

In the U.S.—Aluminium Limited Sales, Inc.
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Aluminium Limited Sales, Inc., Dept. IA-309
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Gentlemen: Kindly send me a list of independent aluminum extruders in my area.

Name_____ Title_____

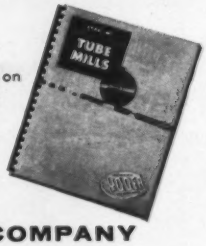
Firm_____

Address_____

City_____ Zone____ State_____

If you need lots of pipe or tube...

YODER makes the mills that make it!



For complete information on YODER Pipe or Tube Mills . . . write for the fully illustrated, 88 page YODER Tube Mill Book . . . it is yours for the asking.

THE YODER COMPANY

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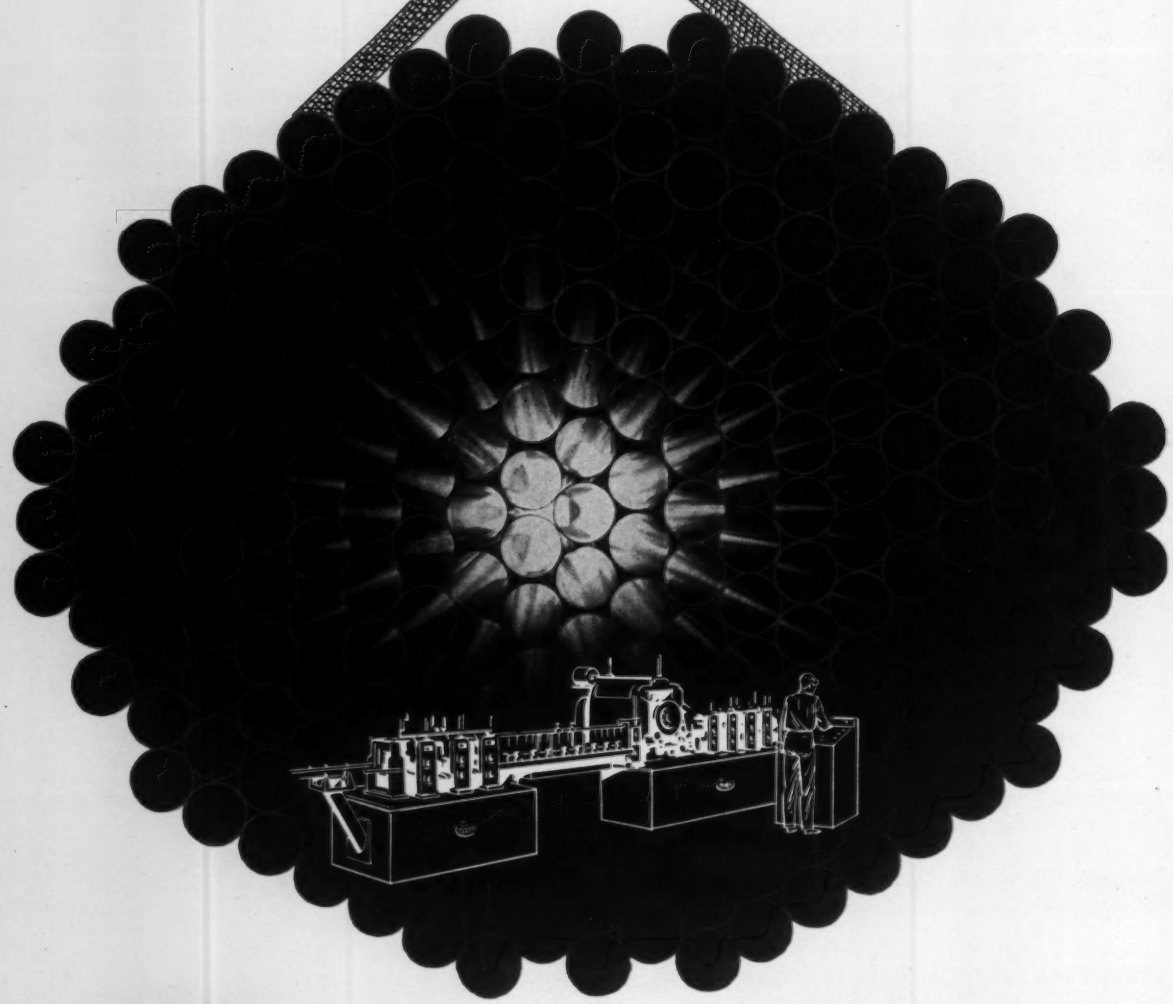


ENGINEERING **YODER** MANUFACTURING

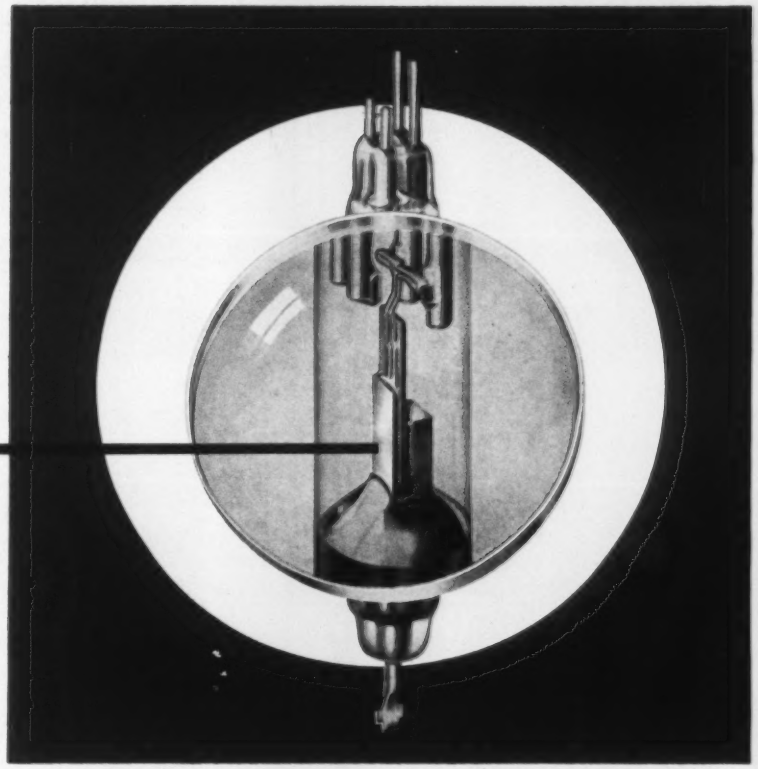
PIPE AND TUBE MILLS (ferrous or non-ferrous)

COLD ROLL FORMING MACHINES

ROTARY SLITTING LINES

BILLIONS OF BENDS

Prove SANDVIK SPRING STEEL'S *Fatigue Resistance*



Here is another example of the extraordinary fatigue life you can get from Sandvik Spring Steel.

C. P. CLARE & CO. uses Sandvik 12W12C1 Steel as the spring support for the armature assembly in their line of Mercury-Wetted Contact Relays. Here, from a letter by Mr. C. H. Smith is what they say about it.

"The steel piece deflects through a complete cycle – once for each operation of the relay. Sandvik Steel was chosen for its excellent fatigue resistance. When you realize Clare HG relays have a life expectancy measured in billions of operations you can see the importance we place on selecting top grade materials."

The steel used for this application is only one of Sandvik's many types of specialty spring steels. Each type provides consistent, predictable results for a specific range of application.

For more information on Sandvik Specialty Steels and how they can be applied advantageously, use the coupon below or send us a note on your letterhead.

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P.O. Drawer 1335, Sta. O.
Montreal 9, P. Q.
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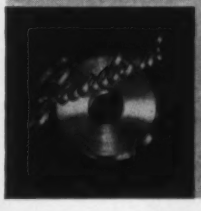


SANDVIK STEEL, INC.
1702 Nevins Rd., Fairlawn, N. J.

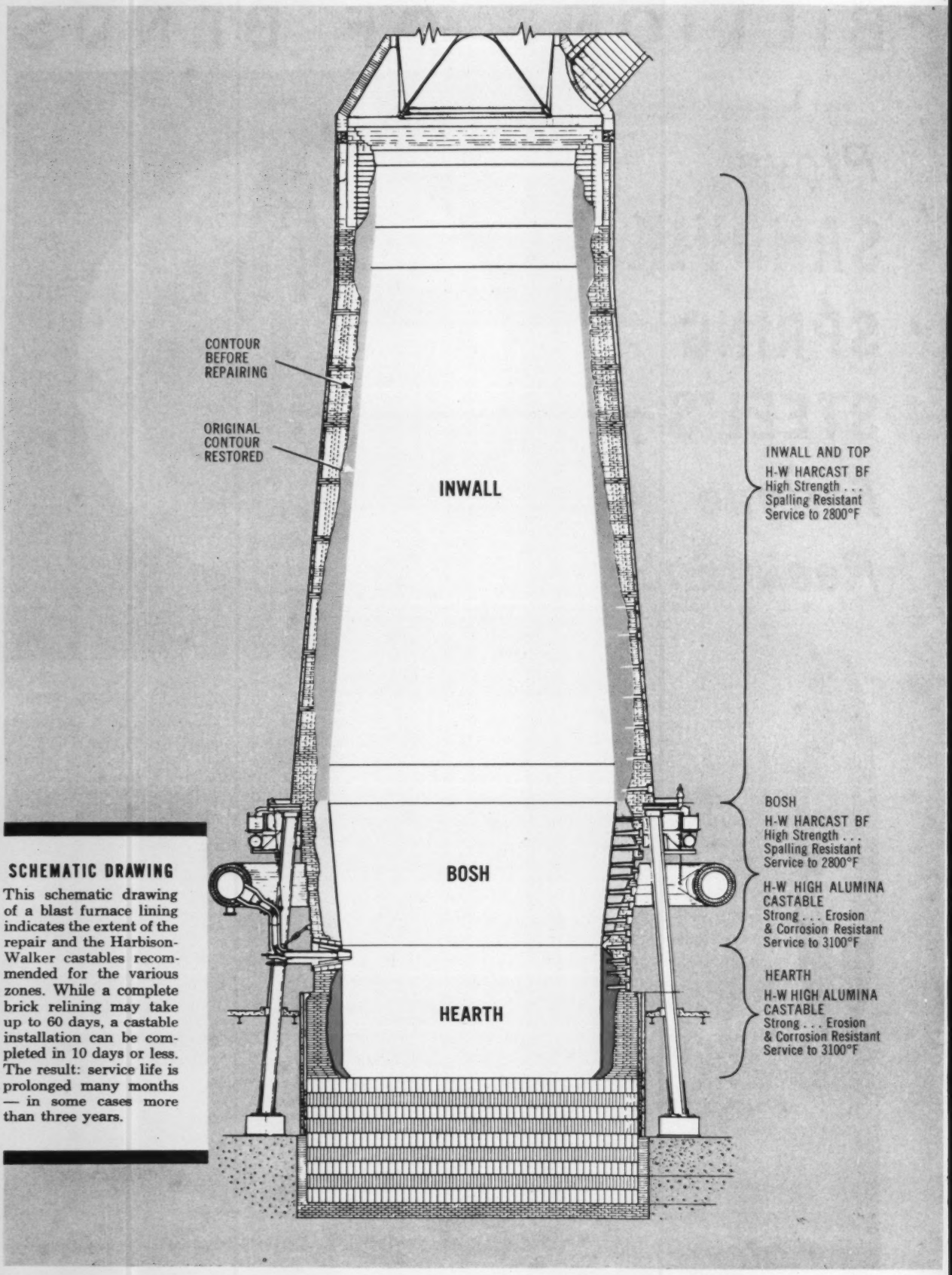
☐ Please send me further information on Sandvik Steels.

☐ Please have your representative phone for an appointment.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____



SCHEMATIC DRAWING

This schematic drawing of a blast furnace lining indicates the extent of the repair and the Harbison-Walker castables recommended for the various zones. While a complete brick relining may take up to 60 days, a castable installation can be completed in 10 days or less. The result: service life is prolonged many months — in some cases more than three years.

HARBISON-WALKER
CASTABLE REFRACTORIES
greatly extend life of blast furnace linings

EFFECTIVE MAINTENANCE IN MORE THAN A DOZEN PLANTS. Hundreds of thousands of additional tons of iron have been produced in these blast furnaces since their worn linings were repaired with Harbison-Walker castable refractories.

A few years ago, these linings would have had to be completely replaced. With today's castable maintenance procedure, furnace relinings can be postponed as much as three years. An important advantage is that while a brick relining may take from 40 to 60 days, a castable installation can be completed in 10 days or less, depending upon the extent of repair.

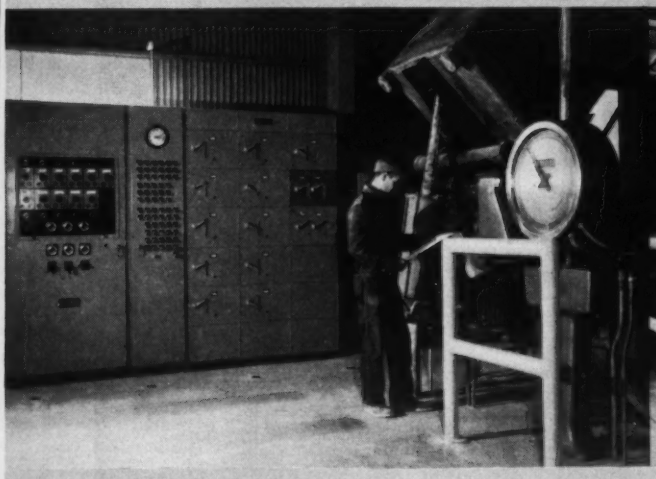
Harbison-Walker's low-iron castables—HARCAST BF and H-W HIGH ALUMINA CASTABLE—were specially developed for this type of service. Imperative to successfully extending lining life is the selection of the best products and the adaptation of the best possible installation techniques.

Write the Harbison-Walker Specialty Sales Department for complete information.

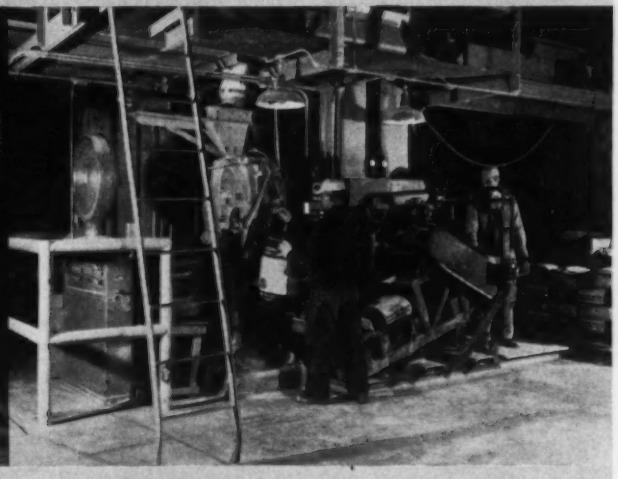
HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES **General Offices: Pittsburgh 22, Pa.**
World's Most Complete Refractories Service

HW-61-1

QUALITY CONTROL (from batching to sacking) IN THESE NEW MANUFACTURING FACILITIES



In this new Harbison-Walker specialties plant where castables are produced—precision batching is assured through utilization of the latest modern equipment.



Strict quality control—from batching to sacking—in Harbison-Walker's specialties manufacturing provides highest quality castables available—**anywhere.**

THE BEST WAY . . . THE SWEPCO WAY

THE PIPE YOU JUST ORDERED

LARGE DIAMETER STAINLESS STEEL PIPE —IMMEDIATE DELIVERY FROM SWEPCO DISTRIBUTORS

No more waiting — Your order is filled from warehouse stock.

SIZE RANGES:
2½" - 12" in Schedules 40 and 80 in 20' to 24' lengths
5" - 12" in Schedules 5 and 10 in 20' to 24' lengths

Available in all types of stainless steel and special metals and alloys.
Swepco distributors are ready to help you in selecting the exact and most economical grade of pipe for your particular application.
Call or write for full information.

Swepco TUBE CORPORATION
One Clifton Boulevard · Clifton, New Jersey

Manufacturers of FFR Full Finished Rock-Forged Pipe and Tubing

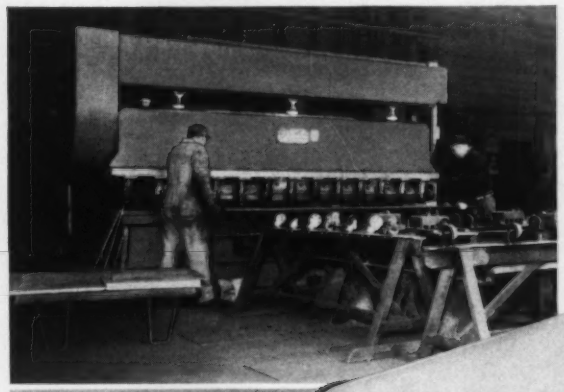
AUTHORIZED Swepco DISTRIBUTORS:

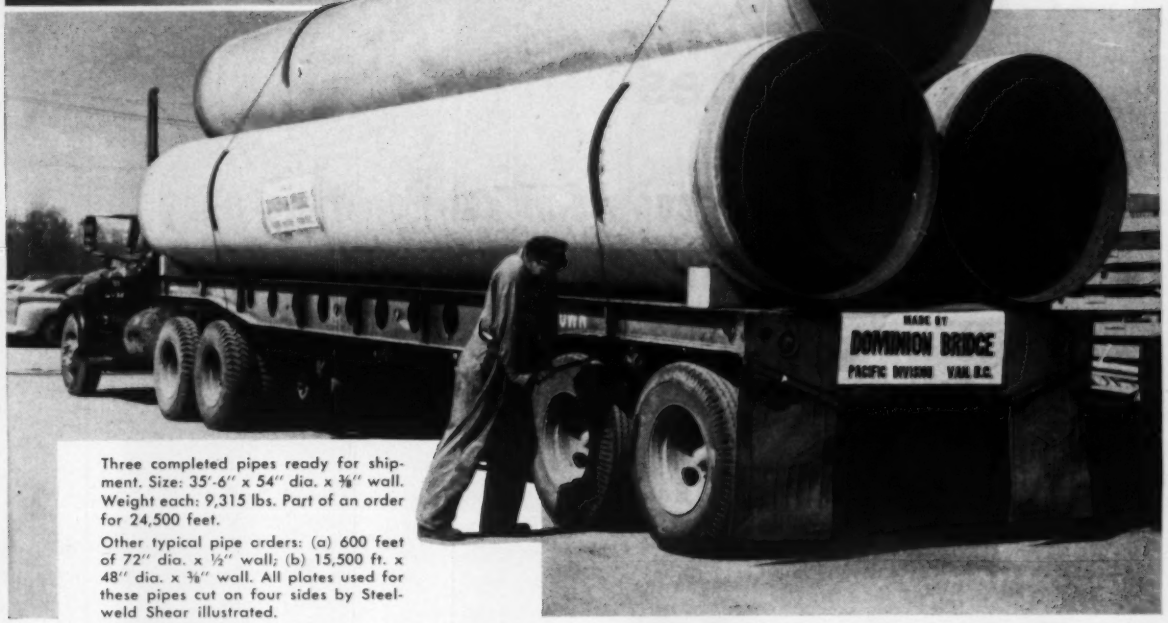
• Alloy Metal Sales Limited • Brown-Wales Company • The Cleveland Tool & Supply Company • Esco Corporation • Esco Limited • Firth Brown Steels Ltd. • Peter A. Frasse & Co., Inc. • R. J. Gallagher Co. • McJunkin Corporation • A. B. Murray Co. • Horace T. Potts Co. • C. A. Roberts Co. • Schnitzer Alloy Products Co. • Service Steel Division, Van Pelt Corporation • Standard Brass & Mfg. Co. • Tubesales • J. M. Tull Metal & Supply Co. • Whitehead Metals, Inc.

CUTS MILLIONS OF FEET OF STEEL SQUARE and ACCURATE

Steelweld Shear Speeds Big Pipe Line Shearing

This shear cuts pipe line plate accurately. It has been doing so for years with only minimum maintenance.





Three completed pipes ready for shipment. Size: 35'-6" x 54" dia. x ⅜" wall. Weight each: 9,315 lbs. Part of an order for 24,500 feet.

Other typical pipe orders: (a) 600 feet of 72" dia. x ½" wall; (b) 15,500 ft. x 48" dia. x ⅜" wall. All plates used for these pipes cut on four sides by Steelweld Shear illustrated.

Dominion Bridge Company, Ltd., is the largest steel fabricating concern in Canada. Among its many activities is that of making steel pipe for Canadian pipe lines. At its Pacific Division, Vancouver, B. C., pipe is made in various diameters, mostly 3'-0" to 5'-0", and usually in lengths of 35'-0" to 40'-0". Pipe walls generally range from ¼" to ½".

One typical order called for 35 miles of 36" pipe in 40'-0" lengths with ¼" and 5/16" walls. This required 10,000 tons of steel. Five to seven plates were used for each pipe. Each plate was cut on all four sides to assure accuracy and squareness required for perfect fitting. Over a million feet of steel was sheared for this job — all on one Steelweld Shear.

The machine worked 15 hours a day, cutting 12,000 to 14,000 feet. The knives needed turning to a sharp corner every 2 to 2½ months, which meant that only after 8 to 10 months of continuous production shearing was regrinding necessary.

Heavy construction of the shear, Steelweld's own air-operated clutch, easy knife adjustment to suit metal thickness, and electric foot switch control, are some of the factors contributing to the success of Steelwelds on hard service jobs.

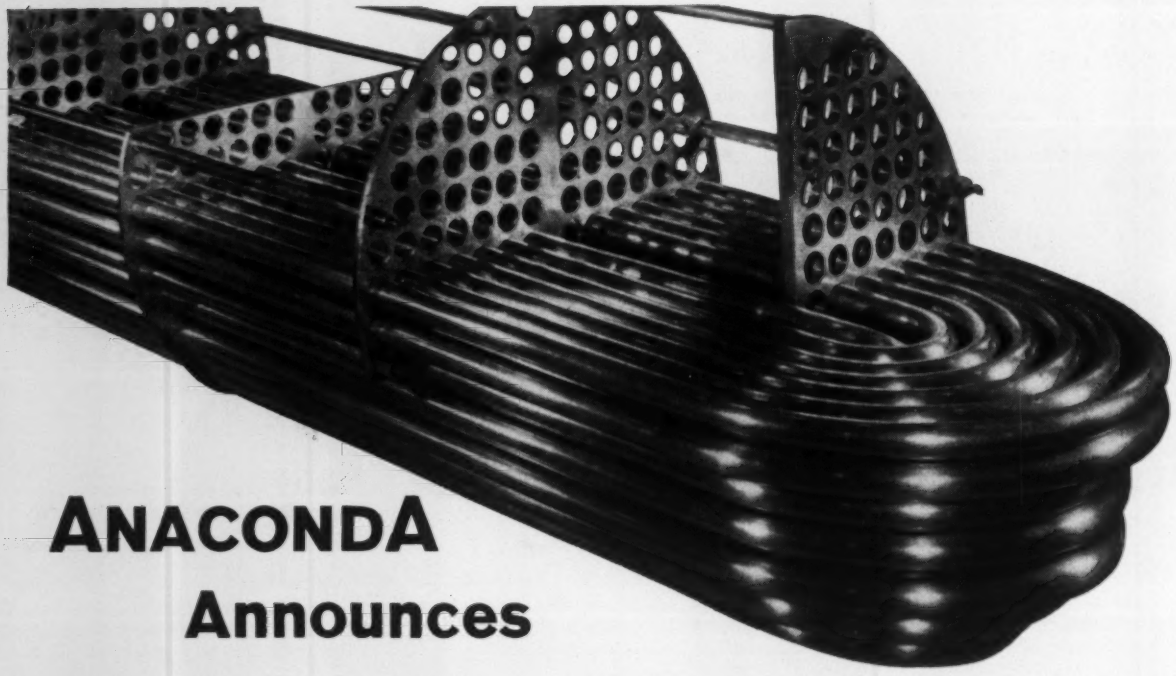
Write for Catalog No. 2011

STEELWELD

PIVOTED BLADE *Mechanical and Hydraulic* **SHEARS**

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4863 E. 282 ST. • WICKLIFFE, OHIO



ANACONDA Announces

A new high-strength copper-nickel-iron tube alloy that makes possible substantial economies in feedwater heaters

Research metallurgists of Anaconda American Brass Company have developed, after three years of intensive effort, a new high-strength copper-nickel-iron alloy — Cupro Nickel, 30%-707—for heat exchanger tubes in power plant feedwater heaters.

Alloy 707 has mechanical properties comparable with those of a premium high-strength alloy now commonly used, and retains its strength at elevated temperatures—allowing working stresses up to 15,200 psi at 600° F. Thus, in an important area of high-temperature heater application it provides material-cost advantages.

And as these high mechanical properties are for the metal in the *annealed* condition, Alloy 707 tubes can be readily cold worked—can be expanded into tube sheets and formed into tight U-bends.

MECHANICAL PROPERTIES of Cupro Nickel, 30%-707 (nominal composition, copper 64.15%, nickel 30.00%, iron 5.25%, manganese 0.60%) are as follows:

Tensile Strength, min, psi	74,000
Yield Strength, (0.5% Extension under Load), min, psi	36,000
Elongation, % in 2", min	30
Expansion of Tube Inside Diameter with Tapered Pin, %, min	30

STRENGTH AT ELEVATED TEMPERATURES. Extensive tests at room and elevated temperatures show that design stresses given below can be used for Alloy 707:

Maximum Metal Temperature, °F	Maximum Allowable Stress Values in Tension, psi
100	18,300
150	17,800
200	17,500
250	17,100
300	16,800
350	16,400
400	16,100
450	15,900
500	15,600
550	15,400
600	15,200

WELDABILITY. Alloy 707 can be welded by the same methods used for regular 30% cupro nickel.

CORROSION RESISTANCE. Alloy 707 has the same high resistance to stress-corrosion cracking and the same excellent resistance to corrosion by salt water as regular 30% cupro nickel.

FOR MORE DETAILED INFORMATION on this new high-strength tube alloy, Cupro Nickel, 30%-707, see your Anaconda representative, or write: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 6160

ANACONDA®

TUBES AND PLATES FOR CONDENSERS AND HEAT EXCHANGERS

Anaconda American Brass Company

WRIGHT SAFEWAYS
Now Available in
ALUMINUM or STEEL

• Take the finest hand hoist ever made for simplicity of design and sturdiness of construction...add to it new external and internal parts of aluminum...and you have the WRIGHT Aluminum Safeway Hand Hoist. This hoist is made lighter and more easily portable, yet retains all the advantages of the original Safeway design. It features load-bearing parts of strong, shock-resistant steel. Aluminum replaces the heavy steel covers, chain guide and hand chain.

It is a self-lubricating hoist which keeps load chain, load wheel and gear train operating smoothly at all times. Gear train is enclosed in grease-tight chamber and stays lubricated for life. Load chain and load wheel are lubricated by wick-type oiler fed from refillable reservoir.

Two factory tests certify the accuracy, workmanship and rated load-carrying capacities of these new aluminum hoists. Every foot of load chain is proof-tested and every completed hoist is tested at 50% above rated capacity.

Available now in six models in a capacity range of ½ to 4 tons, WRIGHT Aluminum Safeway Hand Hoists offer these outstanding features:

GEAR TRAIN • Planetary system using modified involute stub tooth gear form with all gear teeth generated from solid steel blanks.

LOAD BRAKE • Weston type with uniform composition lining and silent pawl.

LOAD WHEEL • Ferrous alloy, reversible, with accurately formed pockets.

LOAD CHAIN • Electrically welded, has maximum wear resistance and ability to withstand extreme impact.

LOAD CHAIN GUIDE • Guides chain into load wheel and shrouds load sheave, protecting parts from falling dust.

BOTTOM HOOK • Nickel-chrome-molybdenum alloy steel. Rocks and swivels. Operates on a Timken thrust bearing.

Contact Your WRIGHT DISTRIBUTOR

Or write our York, Pa., office for DH-164 and DH-345 which give complete information about WRIGHT Safeway Hand Hoists made from aluminum and steel. Find out the advantages they offer you.

WRIGHT HOISTS

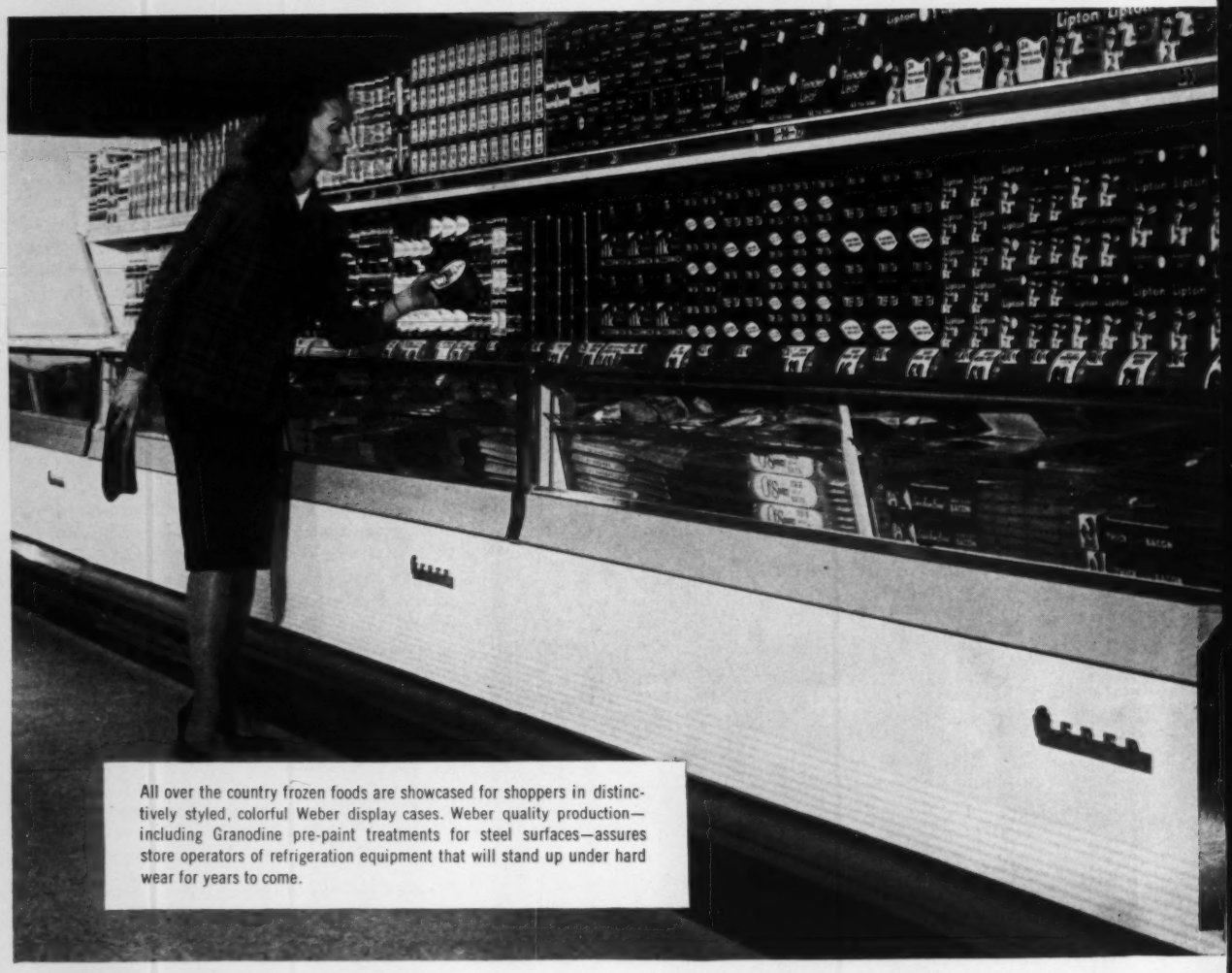
ACCO

Wright Hoist Division • American Chain & Cable Company, Inc.

York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

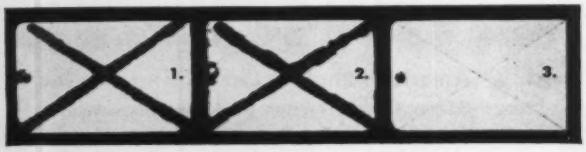
Take a lead from the leaders . . .

Three Amchem GRANODINE* Pre-Paint Economy and



All over the country frozen foods are showcased for shoppers in distinctively styled, colorful Weber display cases. Weber quality production—including Granodine pre-paint treatments for steel surfaces—assures store operators of refrigeration equipment that will stand up under hard wear for years to come.

GRANODINE—The obvious difference in pre-paint treatments



1. Solvent-cleaned—panels failed after 100 hours of accelerated testing.
2. Alkali-cleaned—panels failed after 100 hours of accelerated testing.
3. Granodine-treated—panels excellent after 336 hours of accelerated testing.

Phosphate Systems Provide Quality at Weber Showcase

One line alone achieves fuel savings of $9,000 per year; all three lines maintained by one operator for added labor savings!

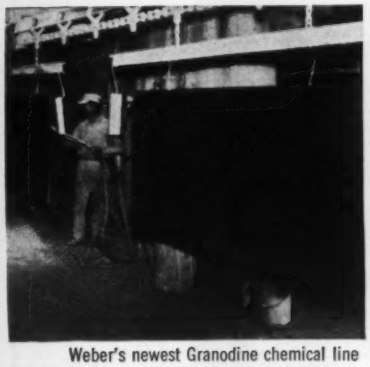
Versatile Weber Showcase & Fixture Company, Inc., headquartered in Los Angeles, places a high premium on quality of its diversified line—supermarket display cases, coolers and fixtures, prefabricated partitions, flooring and lab equipment to mention a few.

High on Weber's quality requirement list is pre-paint treatment of steel products. And their first choice in zinc phosphate coatings is Amchem Granodine. Weber employs three separate Granodine phosphating lines to process hot- and cold-rolled steel.

Prime advantage of Granodine, according to Weber management, is "*Granodine gives us a better piece of merchandise as far as eye-appeal, wearability and service life are concerned.*" Additional savings continue to be recorded in time and labor (a single operator adequately controls all three lines), and a substantial $9,000 annual fuel savings (via use of a Granodine cold zinc phosphate).

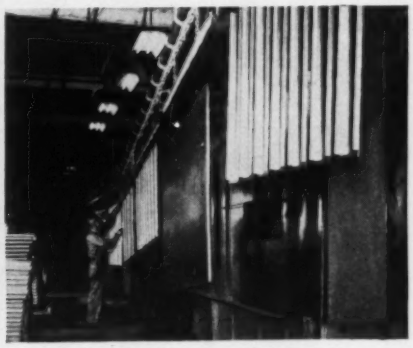
Take a lead from the leaders. If you fabricate steel products—if you want uniform quality in paint adhesion and corrosion resistance—if you want personalized technical service that adds savings in time, labor and cash to your operation, you want to investigate Granodine by Amchem. A call to your local Amchem Representative will furnish you facts and figures.

*Granodine is Amchem's registered trademark for its conversion coating chemical used to produce phosphate coatings on steel.



Weber's newest Granodine chemical line handles steel shelving, large cooler boxes suspended from conveyor.

On Weber's third Granodine chemical line—a cold zinc phosphate—Weber Wall Sheet enters the washer.



Exiting at right from cold Granodine washer, Weber Wall Sheets receive prime coat spraying.

AMCHEM **GRANODINE**

Amchem is a registered trademark of **AMCHEM PRODUCTS, INC.** (Formerly American Chemical Paint Co.)
AMBLER, PA. • Niles, Calif. • Detroit, Mich. • St. Joseph, Mo. • Windsor, Ont.

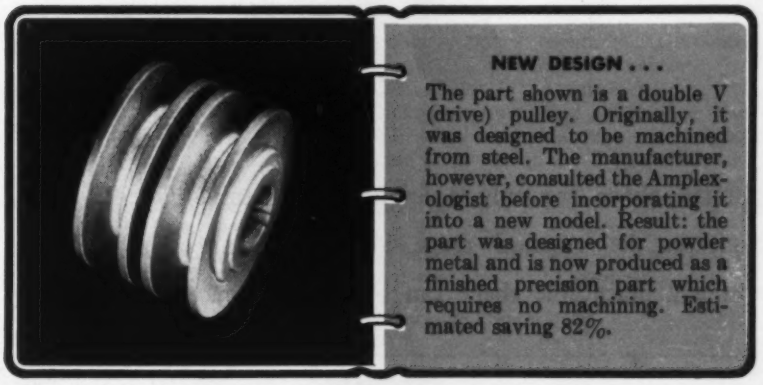
THE AMPLEXOLOGIST

. . . IS ADMITTED TO MANY SECRETS!

Many manufacturers have found it pays *not* to guard some secrets too closely. Especially from the Amplexologist. True, manufacturers are usually reluctant—the first time—to show the Amplexologist new model plans and prototypes *before* the design is final. But only the first time.

Why? Well, first of all the Amplexologist is no blabbermouth. He looks but doesn't talk. And what he sees can help cut costs. For example: *how to make this part, this part, this one and maybe this one, too, through advanced powder metallurgy—and save thousands of dollars in machining costs. Often improve the product at the same time.*

Well, secrets are fun but money is more so. That's why hundreds of manufacturers—in order to take full advantage of powder metallurgy before production begins—happily share their secrets with the Amplexologist. Their confidence has helped make us the world's largest and most experienced producer of powder metal parts. Another reason why leading manufacturers say: **When it comes to powder metallurgy—Amplex has the answer.**



NEW DESIGN . . .

The part shown is a double V (drive) pulley. Originally, it was designed to be machined from steel. The manufacturer, however, consulted the Amplexologist before incorporating it into a new model. Result: the part was designed for powder metal and is now produced as a finished precision part which requires no machining. Estimated saving 82%.

AMPLEXOLOGIST

AMPLEX

DIVISION CHRYSLER CORP.
DETROIT 31, MICHIGAN

A CHRYSLER OILITE® PRODUCT

Illustrated above are only a few of the many different sections in the standard range held. In point of fact, almost any practicable shape can be supplied on request.

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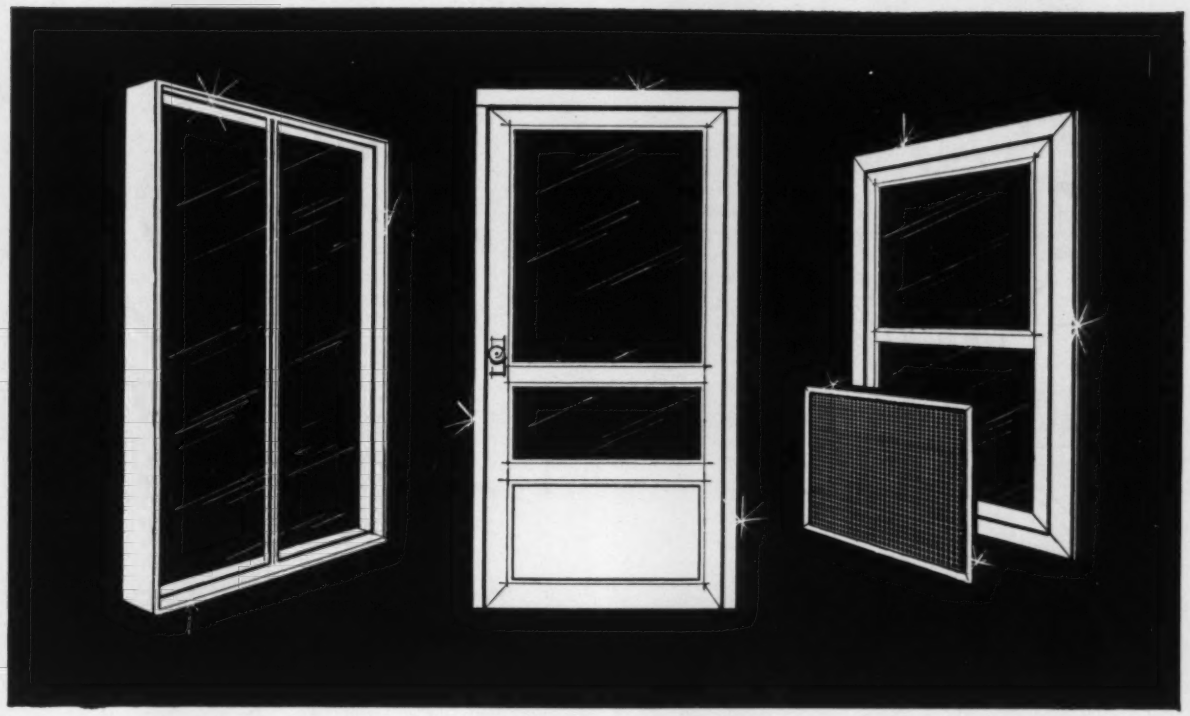
London Office: Brettenham House, Lancaster Place, Strand, W.C.2

Have you received your current copy of The Albion Machinery Catalogue? If not, write for one today. This catalogue contains a comprehensive stock list of all new and secondhand Plant and Machinery, including Machine Tools, Contractors' Plant, Generating Sets and Pumps. It is regularly brought completely up to date and reprinted.



NOW... Colorless Protective BONDERITE Coating for Aluminum

BONDERITE 725 adds exceptional corrosion resistance to aluminum without changing the appearance of the metal!

This new Bonderite produces a *colorless*, amorphous oxide coating on aluminum without the use of electric current. In addition to imparting excellent corrosion resistance to aluminum, Bonderite 725 coatings are an excellent base for clear lacquer and paint finishes.

Colorless Bonderite 725 is particularly suited for use on aluminum building products, windows, storm and screen sash, doors, aircraft parts, automotive trim, boats, appliance parts, castings, and extrusions of all varieties.

Aluminum articles coated in Bonderite 725 and finished with clear lacquer easily meet the stringent requirements of the lime and mortar test specified for certain building products. In addition, articles finished in clear lacquer have good abrasion resistance that reduces scratches during handling and erection.

Bonderite 725 is an efficient, economical chemical treatment applied by spray or immersion application in simple processing equipment. Processing times are as low as 5 seconds.

Up-grade the quality of your products by supplying corrosion resisting Bonderized aluminum in its pleasing natural color. You can add this sales advantage to your product at a treatment cost that will please you.

For complete information now, call or write Parker, or use coupon below.

Parker
Rust Proof Company
2197 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base • BONDERITE and BONDERLUBE aids in cold forming of metals • PARCO COMPOUND rust resistant • PARCO LUBRITE—wear resistant for friction surfaces • TROPICAL—heavy duty maintenance paints since 1883

*Bonderite, Bonderized, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

Parker Rust Proof Company
2197 E. Milwaukee, Detroit 11, Michigan

Please send Bulletin which describes Colorless Bonderite for Aluminum.

Name_____

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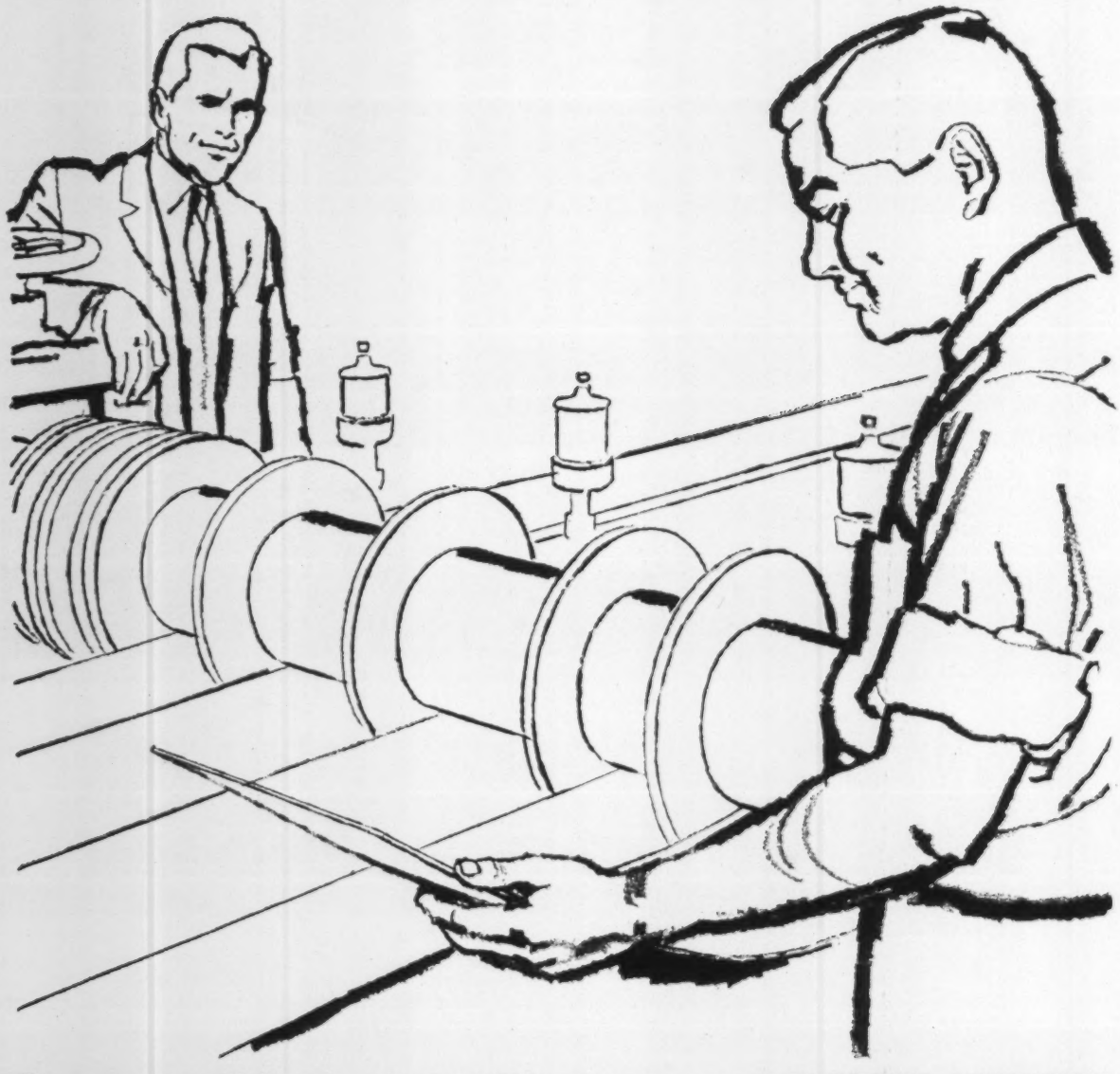


Can you get longer edge life from your SLITTER KNIVES?

A·S·K for the answer!

AMERICAN SHEAR KNIFE

The answer is yes when you use slitter knives from A.S.K. (American Shear Knife Company). A.S.K. Slitter Knives last longer, stand up better under the heaviest jobs, reduce maintenance and replacement costs!

Why? Because A.S.K. has devoted years of research to the selection of proper alloys, and correct techniques in heat treating, precision grinding. For slitter knives that last longer, improve your slitting operation . . . Ask A.S.K.!

FREE HANDBOOK—Want a handy reference on the installation, operation and maintenance of slitter, shear and chipper knives? A.S.K. has the answers in an 88-page manual. For free copy, write American Shear Knife Co., Homestead, Pa.

STEELMAKING AT JESSOP

Listen...

5...4...3...2...1...0...Lift Off!

The countdown is on.

Scientists and skilled technicians scan their instruments, alert to the least sign of malfunction.

Liquid oxygen has been piped into the fuel chamber of the gleaming Atlas ICBM poised on the launching pad. Other last-minute preparations are completed.

Tension mounts. It won't be long. Listen . . .

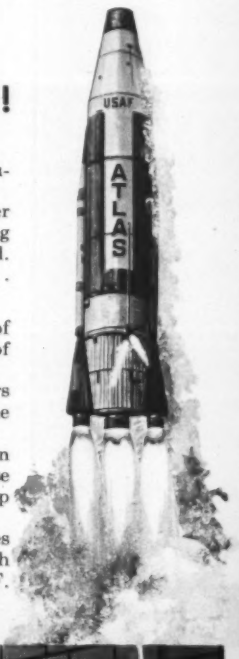
5...4...3...2...1...0...*Lift Off!*

The missile comes to life in a swirling cloud of vapor, exhaust and flame. The engine—capable of 360,000 pounds of thrust—roars thunderously.

Airborne now, the Atlas gathers speed and soars majestically on its predetermined course down the Atlantic range—a successful launching.

Jessop Steel Company makes several alloys used in the Atlas—steels forged and machined into precise but rugged mechanisms. And you will find Jessop steel in the launching pad "plumbing" too.

Swepco Tube Corporation of Clifton, N. J., makes piping for LOX systems that fuel the Atlas with liquid oxygen at temperatures of –300° F. to –320° F. *That's* punishment for any metal.



But Swepco's austenitic chromium nickel Rock-Forged pipe can take it. Ductility—to avoid fracture by reason of brittleness—is an all-important factor in this application.

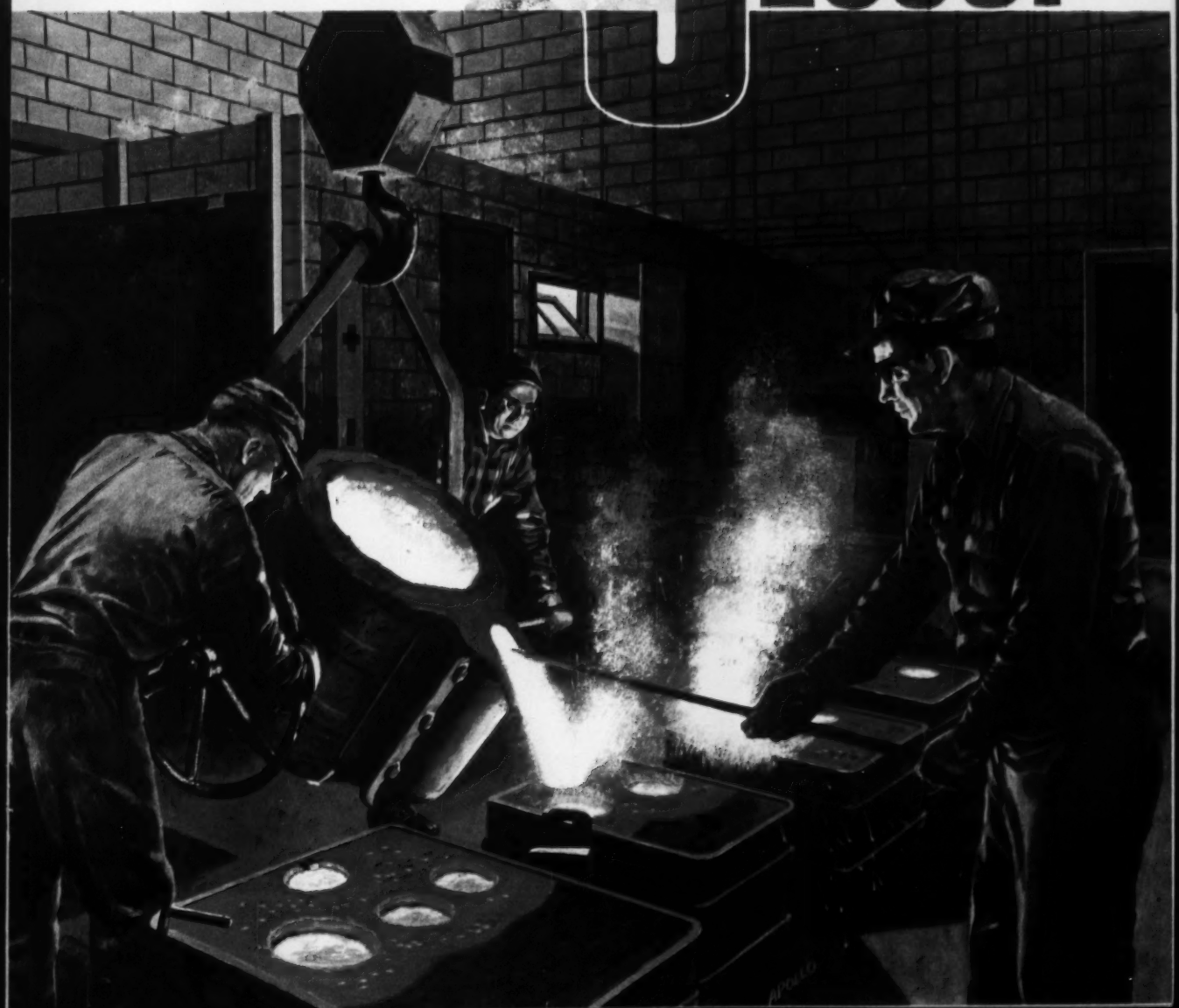
With a value of about 38 foot pounds by Charpy Impact Test, the piping supplied by Swepco handles the job with ease—with an added measure of safety against costly breakdown.

Swepco buys steel from Jessop for rock-forging. Why? Because through controlled chemistry and certain production techniques, Jessop and Swepco developed a steel second to none in workability in the cold forging process.

In making steel like this, experience counts . . . and Jessop has it. Call any of Jessop's 23 sales offices in North America and let us prove it to you.

Plants and Service Centers:
Washington, Pa. • Los Angeles • Chicago • Detroit • Owensboro, Ky. • Wallaceburg, Ont.

JESSOP



How the choice of a cutting fluid affects your costs

Often—perhaps *too* often—the supplier of cutting fluids for machining or grinding, points to the quality of the work and totally ignores its surprising counterpart—a lower over-all cost of operation.

Many a user of petroleum-base fluid might never notice the oversight. A better fortified coolant, which costs more per gallon, would not seem to reduce the final cost of the work, although it can readily be proven to produce better machined parts.

But it is pertinent to examine more closely the cost factors. The facts may surprise machine shop men who have not fully considered all the items which influence their costs. The measurable, tangible cost factors are these:

- Initial cost
- Cost of mixing
- Production rates
- Tool or wheel life
- Machining cost
- Overhead
- Cost of cleaning
- Life of the fluid
- Cost of rejects
- Reworking costs caused by rust

A comparison of first cost with final cost per piece, made on the basis of long experience with both conventional water-soluble oils and the newer chemically conceived fluids reveals some astonishing figures. Just a quick glimpse:

- The modern fluid costs about four times as much as the old soluble oil.
- But that modern coolant can be cut with three times as much water as the oil-base fluid.
- The modern coolant requires less make-up.
- It lasts over six times as long as the oil emulsion—contains nothing to make it turn rancid.
- It enables faster production—machines can be speeded up.
- It requires less frequent emptying and cleaning of machines.
- The over-all cost of coolant per piece produced has repeatedly proved to be upwards of *40% less* with a good chemically conceived coolant than with a conventional soluble oil!

There are intangibles, too, which are not as measurable, but which affect both cost and quality. To mention a few: Cleanliness of shop, operator satisfaction, visibility of work, smoke problems, accuracy of work, adaptability to a wide range of jobs, and safety (fire hazard, slipperiness of floors, etc.).

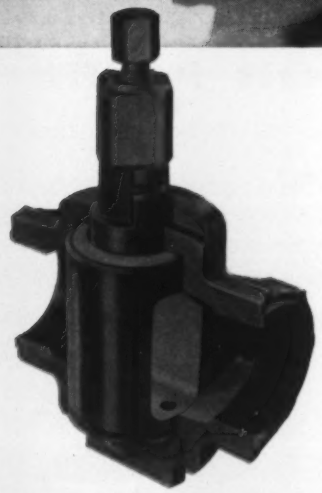
It is illuminating to examine all of these direct and indirect influences a cutting fluid can exert. Little wonder that it is termed the "third leg" of the base on which successful machining depends—the others, of course, being the tooling and efficiency of the machine itself.

Our concern is with the fluid itself, because Houghton has made and supplied many types through the past half-century.

Our recent successes have been with the chemically conceived types of coolants, scientifically fortified to do a double job of improving quality *and* cutting final costs. *Hocut 237* is a perfect example of such a coolant. Data on its applications and availability will gladly be supplied. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION



Cylindrical plug prevents wedging in W-K-M's ACF® Lubricated Plug Valve

With *no* taper, the W-K-M plug can't wedge, can't unseat. *This cylindrical plug can only rotate* — like a journal in a well-lubricated bearing. Result? Even with abrasive ladings the valve remains continuously lubricated and free-turning . . . sealed by a film of grease around the plug and a ring of Teflon at the head.

Wherever service is demanding, or interruptions are costly, specify the valves that *can't wedge* — ACF Lubricated Plug Valves.

WRITE FOR CATALOG 400

Available in either full port or reduced port; rectangular, round, diamond and V-ports; also venturi, multiport and steam-jacketed models.
Materials: semi-steel, Ni-resist, bronze, aluminum
Sizes: ½" through 30"
Pressures: 125 through 800 psi.

W-K-M

DIVISION OF ACF INDUSTRIES
INCORPORATED
P. O. BOX 2117, HOUSTON, TEXAS

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ANY KIND, ANY WAY, SHAPE OR FORM

A CALL TO YOUR LOCAL STEEL SERVICE CENTER ENDS IN-PLANT SHORTAGES *FAST!*

He's a well-stocked, well-equipped source of immediate steel supply, either on an emergency or regular basis. Any kind, any way, shape or form. And best quality. For instance, Weirton Steels: Weirkote continuous-process zinc-coated sheets, Weirzin electrolytic zinc-coated sheets, Weirton hot- or cold-rolled sheets. Whatever your production needs, your local steel service center is ready to give instant service. All you have to do is phone, and steel is on its way to you.

WEIRTON STEEL
Weirton, West Virginia

WEIRTON STEEL COMPANY ®

Weirton Steel is a division of **NATIONAL STEEL CORPORATION**

MAKERS OF BUILDING MATERIALS may find an ever-increasing need for factory-made components in the near future. Leading homebuilders attending the Builders' Intentions Conference last week said the demand for low-cost housing is greater than ever. With the cost of land and labor still rising, prefabricated parts may be the answer. (P. 55).

"EXTREME OPTIMISM" OF AUTO DEALERS was noted by GM's Chevrolet Div. general manager, Edward N. Cole after a two-week series of meetings with his dealers. The dealers are optimistic about "the market potential for 1961," despite a lean January. Mr. Cole expects a 10 to 15 pct sales rise for Chevrolet in February.

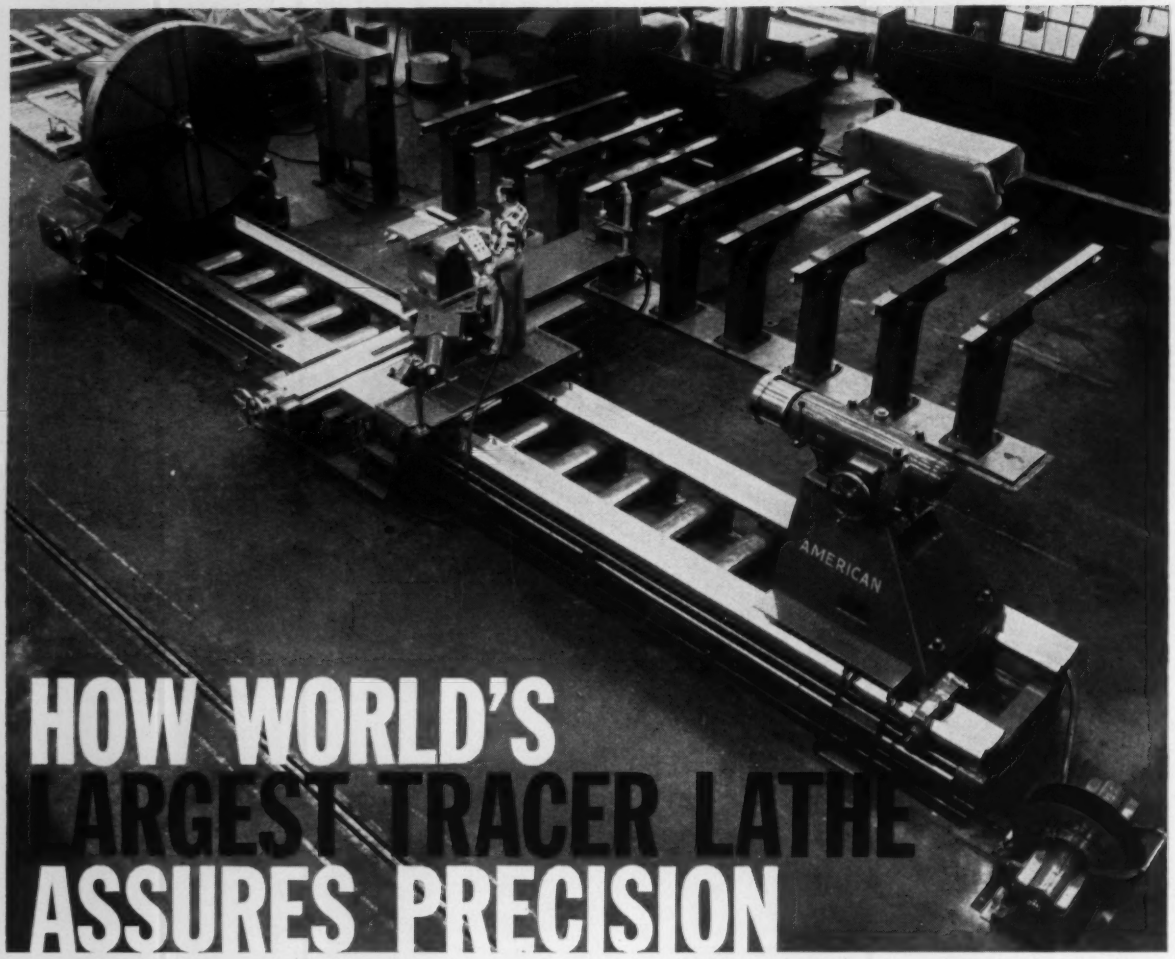
CONSUMERS' CLUBS ARE GROWING AND SPREADING. These shopping centers are open only to members who pay a nominal charge for life membership. Manufacturers who rent space are assured a captive market group and must offer good discounts. Started in 1956, 16 clubs now have $250 million annual sales at 36 centers.

METAL CAN SHIPMENTS during 1960 were the second highest on record and only 3 pct below peak level of 1959. Industry observers forecast a 4 pct rise in shipments in 1961. Reason for optimism: Expected gains in already-soaring soft drink can sales and low carryover stocks of canned fruits and vegetables.

A BUSINESS TURN FOR THE BETTER is viewed by many investment analysts as near-hectic activity hit the stock market last week. Here's the blunt appraisal of Merrill Lynch, Pierce, Fenner & Smith, the nation's biggest stock brokerage firm: "The stock market is saying that business will soon turn upward." Some of their best bets: machine tools, steel, and defense electronics.

THE USE OF ALUMINUM IN "CONTAINERIZATION" is expected to rise to 185 million lb by 1970. Present annual usage is 7 million lb. This data, a forecast of Aluminum Co. of America, is based on the metal holding its present 97 pct share of the market.

TITANIUM'S COMEBACK is spelled out by shipments of 10.1 million lb in 1960. The bottom dropped out of the titanium market in 1958, when shipments fell to less than half the 1957 peak of 11.3 million lb. Output rose 12 pct in 1959. The 33 pct gain in 1960 made the year the second best for the metal.



HOW WORLD'S LARGEST TRACER LATHE ASSURES PRECISION

Engineers of The American Tool Works Co. design maintenance of high precision right into their new Maxi-Swing Tracer Lathe with 16 Timken® tapered roller bearings on the nose and center of the spindle, drive and intermediate shafts. That's because Timken bearings are designed and manufactured to take the big loads from all directions of this machine cutting ¾" deep into work pieces of up to 40 tons. And they do it through a range of 22 speeds, giving rigidity with compact mounting and ease of assembly.

ON-THE-SPOT ENGINEERING SERVICE. Our sales engineers can help you right at the design stage to get the most economical bearing in terms of needed capacity and precision. Why not call them in early?

Industry rolls on

TIMKEN

tapered roller bearings

The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.

LOW-COST HOUSING: Homebuilders say low-cost homes could open new markets. But there are problems.

Cost, Dollar Value Challenge New Home Market

Homebuilders predict a slight increase this year over 1960's declining levels.

But they say low-priced homes with more dollar-value would open up new markets.
By B. F. Surer

■ Homebuilders are hopeful but not enthusiastic about the market prospects for 1961.

Leading homebuilders from all parts of the United States met in Washington last week for the sixth annual Builders' Intentions Conference. The conference, sponsored by the National Housing Center, brought builders together with government officials to study 1961's potential.

The result: Most builders look for a slight increase in housing starts this year. But at best, they say, 1961 will be only two pct better than last year.

There were those at the conference who predict gains of five to ten pct in 1961. But nearly 50 pct of the builders polled say this year will be no better than 1960.

Big Dropoff—Homebuilding last year has been described by the Dept. of Commerce as ". . . an area of contradiction in the nation's economy." While other building climbed in 1960, home construction fell 12 pct below 1959 levels. Residential contracts totaled $15.1 billion—a 17 pct drop from the preceding year.

The situation facing homebuilders in 1961 shows a large surplus of unsold homes carried over from last year. On top of this, present economic conditions have many potential buyers "nervous."

Roland Catarinella, Pittsburgh builder, told The IRON AGE, "Until we gain buyer confidence in the economy, it's going to be hard to sell homes."

Bad weather in January and February prevented many builders from doing much more than planning. Residential construction in the first two months dropped 11 pct from the 1960 level.

The expected pattern for the rest of the year shows continued lags through June with an upturn expected in housing starts during the second half.

Untapped Market—What really frustrates builders is a virtually untapped market in low-cost housing. Vondal S. Gravlee of Birmingham claims, "Low-cost housing could open up new markets for us. But this isn't going to be easy. We still have to find a way to produce low-cost homes and still make them desirable to the public."

Says Oklahoma homebuilder Burl Johnson: "Builders will have to put more emphasis on cost-reduction, better merchandising methods and more value per dollar if new mar-

Cost-Conscious Builders React

Leland Baum, Milwaukee: "This year will probably show a big gain in rental unit production. The cost of land is still the big factor preventing low-cost housing of quality."

Lloyd E. Clarke, Des Moines, Ia.: "A feeling of economic insecurity is the reason people aren't buying homes. This will pass. But builders are going to have to be willing to develop lots, build homes, and sell the homes for one profit."

Donald L. Dise, Aurora, Ill.: "A lot of builders read somewhere that everyone was going to spend more money for homes. So they went out and built high-priced houses. Now these builders are working for the builder who put up the low-priced home. You just have to talk value these days."

Earl W. Smith, El Cerrito, Calif.: "It would be nice if we could gain back our market—as did automakers—with "compact" houses. But we can't. We have to find a way to give quality without expense. And this is no easy task."

J. Griffin, Oklahoma City, Okla.: "Builders aren't making a fair profit these days. The solution is a crash program activated by the industry experts and high, high level members of the Kennedy Administration."

William Levitt, Levittown, N. J.: "If you are in the right market with the right product at the right price, you'll do business."

kets are to open up."

No Surprise—Of course, the present lull in housing activity comes as no surprise to the building industry. Most forecasters predicted the 1960's would start slow before reaching "boom" proportions by 1970 (See IA, Sept. 29, '60, p. 78).

"But it's slower than we expected," says one builder. "It's caught many of us with larger surpluses than the market can absorb."

What about the effects of present mortgage and financing conditions?

Dept. of Commerce notes: "Also exerting a dampening effect on demand for new housing last year was the tight credit that prevailed in the latter part of 1959 and into 1960. Mortgage credit availability was affected not only by the generally rather stringent conditions of long-term credit, but also by the tendency of financial institutions to place in relatively liquid forms most of the growing stream of funds received as deposits from individuals."

Little Done—Nathaniel H. Rogg, director of economics, National Assn. of Home Builders, told The IRON AGE, "Improvement in interest rates has done little to stimulate the business we're looking for."

The builders feel the answer to increased sales may be a reduction in minimum down payments. Although President Kennedy promised aid to the housing industry in his news conference last week, only one real step has been taken thus far to reduce down payments.

The Federal Home Loan Bank Board, central banker for the nation's savings and loan associations, recently unleashed a five-point program to make more housing credit available with reduced down payments and lower interest rates.

Under the old plan, a Federal savings and loan association could lend only $18,000 on a $22,000 home, for example. It can now lend up to $19,600. However, many homebuilders feel this still makes the down payment burden too great for the home buyer.

Under Consideration—Washington builder Lloyd Hammersmith says he has talked with the FHLB concerning 90 pct financing of homes. "They say it is a recommendation to be seriously considered," says Mr. Hammersmith.

Other builders, such as value-conscious William Levitt, have been asking for 90 pct financing and 40-year mortgages for some time.

But builders still revert back to this point: No matter what kind of financing arrangements are available, value must still be given in low-cost homes. Conference statistics show that 18 pct of the 1960 homes sold for less than $12,000. In 1961 this figure should rise to 27 pct.

High Hurdle—Land cost is still the biggest hurdle for builders attempting to reduce cost. But they report that the industry as a whole will be trying to compensate for this in 1961 with a greater use of manufactured components and prefabricated parts.

In fact, low-priced housing is expected to lead the housing market in gains in 1961. Three builders out of five expect an upturn in this sector. Less gain is anticipated in the medium and high-priced markets.

Other builders' predictions: Some increase in apartment building in close-in areas; no gain in suburban apartment building; and additional gains in home improvement markets encompassing additions, alterations and remodeling.

The answer to the homebuilding problem is probably best summed up by Seattle, Wash. builder C. Fred Dally: "Builders in the coming year have to build different houses with new products and methods. They will also have to make better use of research."

Export Credit Overhaul Likely

Stronger Guarantees Would Aid Exporters

Both Congress and the Administration study ways to improve the U. S. export credit guarantee system.

In an IRON AGE interview, Sen. Magnuson reviews the problem and what's likely to be done about it.

By R. W. Crosby

■ The U. S. Senate's top foreign commerce troubleshooter predicts overhaul of the government's export credit guarantee system will begin next month.

In an exclusive interview, Sen. Warren G. Magnuson, (D-Wash.), chairman of the Committee on Interstate and Foreign Commerce, said overhaul would come from one or more of these actions:

A shift by the U. S. Export-Import Bank in its own policy.

A revision of the system by President Kennedy.

Corrective legislation.

Review by JFK—President Kennedy has ordered the Export-Import bank to submit an evaluation of the program and proposals for correcting its defects in April.

The President will review the program. If he finds that the deficiencies still exist, these actions will be taken:

The President will devise a new system of guarantees.

Sen. Magnuson will introduce "corrective" legislation.

The Senator said this is the basic problem of guarantees to private companies. The U. S. system "does not cover U. S. exporters as extensively as their competitors are covered in their own countries."

Down Payment Problems — "Specifically," Senator Magnuson continued, "on short-term guarantees private companies do not seem to be responding to the need of providing sufficient commercial risk coverage to parallel political risk coverage offered by the Export-Import Bank. And on medium-term guarantees the requirement for 20 pct down payment by the foreign importer may be too rigid."

This basic problem is taken up in a special Foreign Commerce Study to be made public next week by the Interstate and Foreign Commerce Committee.

Study Coming—Members of the study staff question whether the Export-Import bank is the proper facility for export guarantees. They lean toward, a solution of the problem like that suggested by the National Coordinating Committee for Export Credit Guarantees.

This committee recommends that a commercial-type, privately-owned system chartered by the government be set up.

Asked what he thought of this idea, Sen. Magnuson said:

"I think this proposal has considerable merit. Some problems do exist however. It should not be a monopoly—other insurance companies should be allowed to participate. It does, however, present the basis for an alternative should the present program fail."

Some private insurance companies are already trying to meet credit risk needs. Five or six U. S. companies are discussing plans to operate as a pool in offering coverage for commercial risks to U. S. exporters. This plan is in tune with Sen. Magnuson's ideas and those of President Kennedy. The President says we want private lending institutions to come into the program on a broader basis.

Sen. Magnuson believes a program can be drawn up which would get the support of Congress and private exporters.

SEN. MAGNUSON: Exporters should keep Eximbank informed.

Buyer Poll Shows Bright Signs

Decline "Bottoms"; March May Be Month for Upturn

The National Assn. of Purchasing Agents' monthly survey has been a good barometer. Buyers now report production and order gains are firming.

But buyers plan to keep tight controls on stocks.
By G. J. McManus

■ Has the recession run its course? Are we moving into a new kind of recovery?

These questions are raised by the latest survey of National Assn. of Purchasing Agents (NAPA). The February report indicates a bottoming out of the decline. It points strongly to March as the month for a general upturn.

But how "right" is the survey? This much can be said: The survey has a good record as a business barometer. And many like the idea that the survey draws on men who largely control the conditions they report.

Production Gains — For three straight months now, the number of purchasing executives reporting production gains has increased. The number with new order increases has been moved up for two months.

In both production and orders, there are still more plants showing losses than gains. However, the gap is narrowing. In December, orders were down for 34 pct of the plants checked; orders were up at only 17 pct.

In January, upward movement was reported for 24 pct of the plants and in February this group was 25 pct. The group with declining orders held constant in January, dropped to 29 pct in February.

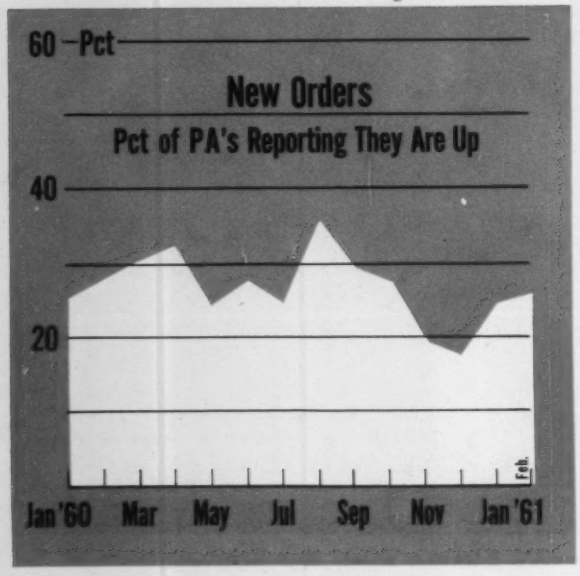
If the trend continues, both production and orders will be on the plus side in March. This would be the first time in 10 months more companies were moving up than down.

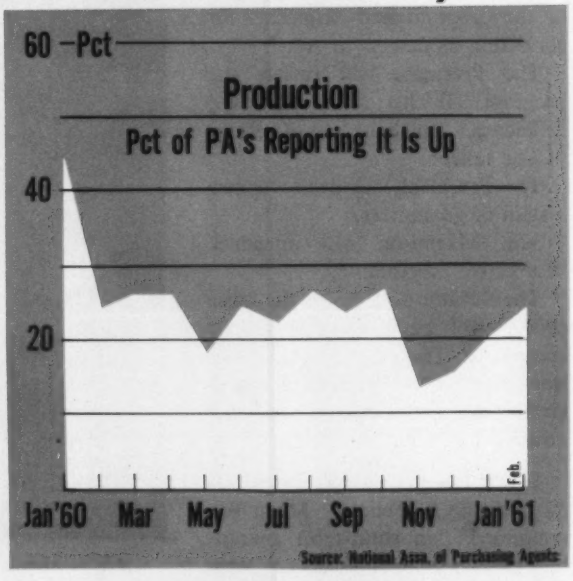
Strong Trend — And there are grounds for hoping the trend will continue, says E. F. Andrews, vice president in charge of purchases, Allegheny Ludlum Steel Corp., and chairman of NAPA's survey committee.

Mr. Andrews points to the three-month improvement in production. In the recent history of the survey, he says, a new movement of this duration has invariably turned out to be a sustained trend.

All this is particularly encouraging because of the authority the purchasing survey has gained as an economic barometer. In the 1958 recovery, it showed as early as January that orders and production were starting to curve out of the decline. In January 1960, the same items showed the boom was running out of steam. By May, they indi-

Do the Order Upturns Forecast a Recovery?





cated a definite slide underway.

This performance is attributed in part to the fact that NAPA can draw on men with both knowledge and control of the conditions they report. In its survey, the association takes a cross section of a group numbering 18,000 and spending $180 billion a year on goods and services.

First-Hand Knowledge — "Any purchasing man can tell you what he's going to buy in the next 30 days," says Mr. Andrews.

This is true even under today's rush conditions. The February survey shows that more than 85 pct of all buyers are still placing orders at least 30 days ahead of time.

Moreover, the short time lag in NAPA's reporting system means a very quick reaction to economic changes. Where government reports may run months behind actual events, the purchasing reports are compiled and published within two weeks of the earliest event reported.

This speed may explain why the purchasing survey is now showing optimism while most indicators are still dragging bottom. The optimism is tentative and uneven. Employment took a sharp dive in the February report. Inventories, which had showed signs of moving up in January, dropped again last month.

History Repeats—However, this jagged pattern bears a striking resemblance to that shown by the survey in early 1958. New orders and production began righting themselves first. Employment was slow in recovering. It was not until that May that inventory liquidation started slowing.

The inventory lag could be longer this time and the eventual buildup much milder. A special question in the February survey asked purchasing men how they will handle inventories when business improves.

Forty-eight percent said they would keep stocks at current levels in relation to needs. Another 47 pct plan to carry less inventory in relation to needs.

Corporate R&D: Facelifting Due

Corporate research departments will be undergoing changes in the next few years.

Three research experts say R&D will now have to become a result-producing area. Research funds must be justified.
By K. W. Bennett

■ Corporate research departments are often the burial ground for financial mistakes.

This, says three top research directors, will soon stop.

The experts: John C. Lobb, vice president-corporate planning, A. O. Smith Corp.; C. Guy Suits, research director, General Electric Co.; and Maurice Nelles, vice president-engineering, American Electronics, Inc.

The consensus is that tougher research department evaluation is in the near future. At a recent Univ. of Chicago management seminar, the research experts said too much money is poured into R&D projects for a product that is already obsolete.

Seek Payoff—Mr. Lobb suggests that companies put more money into new fields where the payoff is higher and faster. He says too much research is undirected. There's a corporate tendency to let the R&D chief "wander" into product areas. Often these areas aren't backed up by company experience or marketing capability.

Mr. Suit points out that R&D can be a tool to offset obsolete product losses. To do this it must create new products, not redesign old ones. He maintains that companies will go downhill without new products to market.

The research men agree that research will continue to expand in the 1960's. But it won't boost the investment return as rapidly as in the 1950's. In the past decade, capital outlays were cut to boost research funds. Look for this trend to reverse before 1970.

Prove Return—Another expected trend: Research departments are going to have to prove their bringing an investment return.

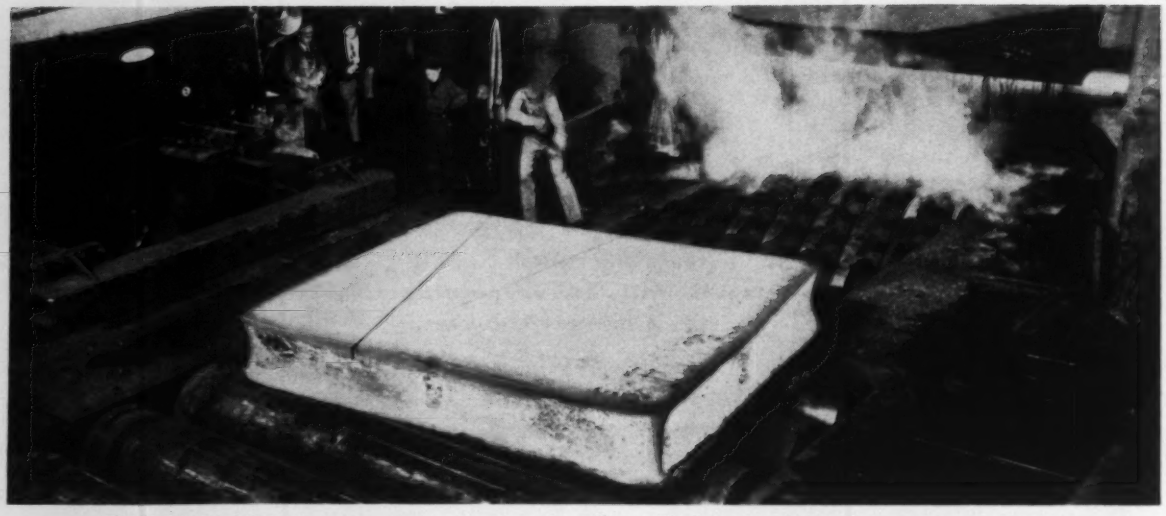
American Electronic's Mr. Nelles says "We must return to objective ratings for our research departments."

He proposes five management considerations: (1) How much have your R&D outlays cut the break-even point since 1958? (2) How many patents or papers have been produced by your R&D staff annually? (3) If you're spending $100,000 annually for research, there should be at least twelve potential products ready. (4) Are your new products coming from inside the company? (5) What is the ratio of time spent on experimental work and paper work by your research men?

Produce Results—The new research director, say the panel, will be judged on production. Less attention will be paid to "executive types" in R&D.

Along with a more critical study of research departments, will come a more severe look at R&D directors. The ideal man, according to the experts, will be trained for the job. Under his leadership, departments must show a profit. Or they must be staffed with men capable of pushing research into the black.

Sift Results—Industrial research men say research is still a good investment. But top management will be sifting the results with a more critical eye in the near future.



ATOMIC PLATE: Stainless-clad steel plate is rolled at Lukens Steel Co. to house a reactor core.

Nuclear Market to Explode—If

Right Reactor Will Mean Commercial Breakthrough

The nuclear market is growing at a steady rate.

But when a better and cheaper reactor is developed, the Atomic Energy Commission expects a breakthrough explosion.
By F. J. Starin

■ "The nuclear market is growing something like this," explained the Atomic Energy Commission executive.

He drew a gently inclining line on a blackboard.

"But the various types of reactors are running about neck-and-neck in efficiency and economy. Those with a nose in front are the ones we've been working with longest.

"Some day, we hope soon, one of these reactors will prove substantially better and cheaper to build and operate. We'll concentrate on it. And then nuclear markets will start growing something like this."

His chalk line went right off the top of the blackboard.

Commercial Speedup—The implication is clear. Soon after the breakthrough, AEC hopes production reactors for commercial power will go up in volume. Spending for plants and equipment will then greatly speed up.

The prediction that one reactor (or few at most) will eventually take over the market has a double warning for equipment suppliers.

An AEC spokesman suggests that a supplier must advance in market understanding and product design, by the time of the breakthrough, to take full advantage of it. But he admits a company runs the risk of getting tied too closely to a particular type of reactor which may be phased out.

Exactly how big is this market? And what is metalworking's stake?

$3 Billion A Year—The nuclear industry, primarily AEC and its contractors, now spends close to $3 billion annually. Much is for products and materials.

In 1959, the latest year for which AEC and the Bureau of Census has figures, manufacturers' shipments of key atomic energy products totalled almost $245 million. This was up about 50 pct over the $162 million shipped in 1958. And substantially over the $100 million shipped in 1957.

Many items on this list are basically instrumentation and control. But some with high total cost are from metalworking.

Tanks and Condensors—Primary vessels and tanks shipped to nuclear markets in 1959 totalled almost $20 million. Heat exchangers and condensors hit over $27 million, more than double 1958's.

Totals for some others: Pumps—$19.4 million; valves—$13.9 million; fuel handling equipment — $1.7 million, the first time this item has been in large enough volume to be classified by itself; core structurals — $5.2 million; pressurizers, components and auxiliary

equipment—$3.6 million.

In every category, 1959 shipments clearly topped any previous year. And although statistics for 1960 haven't been published yet, AEC spokesmen say the growth trend will continue.

Non - Nuclear Equipment — An AEC official noted that this Bureau of Census report does not include non-nuclear equipment such as cranes, lift trucks, storage bins, office equipment, etc. The need for conventional equipment closely parallels needs of an average chemical processing plant.

The atomic energy market for metalworking doesn't end there. In 1960 AEC spent $332 million to construct new plants, 11 pct more than the previous year. AEC now has under construction or authorized $1.2 billion in new plants.

Know the Market—What should metalworkers know to take advantage of this growing though touchy market?

First, the whole market revolves around the Atomic Energy Commission. However AEC does no buying at its rambling headquarters, 26 miles from Washington, D. C.

A publication "Selling to AEC" is probably most helpful. This is issued annually and lists all AEC procurement offices, and those of its prime contractors. It also lists the men in each office for vendors to contact.

An AEC executive says the specifications for parts and components are not unduly complicated. They stick to standard specifications when possible.

Unique Problem — The major problem in specifications has been the factor of irradiation, unique to this industry. Simply stated: Neutron bombardment of a part or component changes its physical attributes.

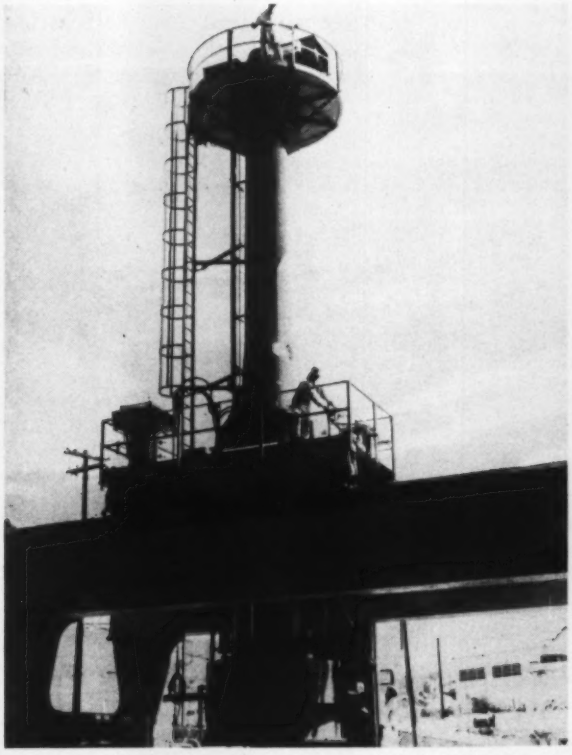
A rule of thumb: Radiation weakens a material, almost never improves its performance. But so little is known on this subject that AEC is being forced to do its own testing and evaluation. Few specs are really firmly established.

Breakthrough Soon?—How soon can industry expect the breakthrough?

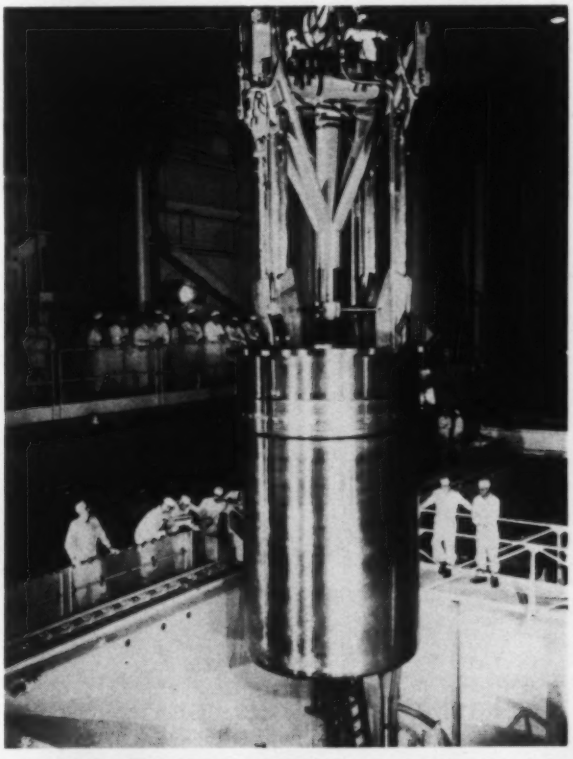
No AEC official will even hazard a guess. But things could start perking up.

Plans Point Way — Where will AEC's efforts be concentrated? The recently released Plans for Development, Civilian Power Reactor Program (TID 8519), points the way. Some projects of greatest interest to industry:

Methods to obtain higher heat transfer rates in reactor coolants; Improved instruments both in-core and out-of-core; Fuel handling equipment to permit interchange and remote removal and replacement of reactor fuel element assemblies while the reactor is in operation; Equipment for remote fabrication of fuel elements.



FUEL LOADER: This 54-ft high atomic fuel handling machine will load 40-ft long reactor components.



ATOMIC-ELECTRIC POWER: Nuclear fuel is lowered into position at Shippingport, Pa., power station.

Iron Ore Work Booms in Canada

Long-Term Needs Spur $500 Million Projects

Two new iron ore projects in Eastern Canada are fast nearing the production stage.

Quebec Cartier Mining Co. and Iron Ore Co. of Canada are spending $500 million on ventures in Quebec and Labrador. By Tom Campbell

■ If you feel a little uncertain about the future, look far north to Eastern Canada. There, more than $500 million is being gambled on two iron ore projects.

U. S. Steel Corp. is betting close to $300 million that the steel industry over the years will require millions of tons of concentrated iron ore from its new Canadian subsidiary, Quebec Cartier Mining Co. There is little chance of loss.

Not too far northeast of Quebec Cartier's project, the Iron Ore Co. of Canada is making good headway with its Carol Lake ore venture. More than $200 million will be spent by this company, owned by six U. S. and three Canadian companies.

Barrel of Problems — Quebec Cartier is guided by Lloyd Severson, its president and long-time geologist for U. S. Steel. Mr. Severson has had his hands full with a barrel of problems. Most stem from a severe storm in the area of Shelter Bay and Sept Iles. It damaged part of the work in this area on the north shore of the St. Lawrence River.

High winds and extreme ice conditions set back work on the man-made bay at Port Cartier by at least two months. The railroad to the mines and townsite some 193 miles north of the port has been completed. The concentrating equipment is getting a break-in at the mine site while the work of finishing the port and its equipment and machinery is being rushed forward —as fast as possible under difficult conditions.

Shipments Scheduled—Iron Ore Co. of Canada will probably complete its project about a year later than Quebec Cartier. The latter will be shipping ore from its new port by at least the end of June this year. Iron Ore Co. of Canada hopes to have its ore on the way by mid-1962.

Heads of both projects are enthusiastic over the results of tests on the ore. It concentrates well and a product of 64 to 66 pct Fe is not expected to be hard to come by.

While each mining venture has a different type of concentrator, each believes it will be tops in unit cost and production. Grain structure is excellent and the ore lends itself to concentration.

Pelletizing Ore—It is expected that some time over the next few years, both companies will be pelletizing their ore—or at least part

WILDERNESS MILLS: Quebec Cartier's concentrating mills in remote Upper Quebec have been built at Gagnon, a new town that will eventually consist of 2000 inhabitants.

MAN-MADE HARBOR: This is a bird's-eye view of the man-made harbor at Port Cartier from which Quebec Cartier Mining Co. will ship 8 million tons of ore concentrates per year.

of it. Iron Ore Co. of Canada will probably mix some of its concentrated ore with its open pit ore coming down its railroad from Schefferville, about 140 miles northeast of the newer Carol Lake project.

(Carol Lake is to be christened Labrador City, Newfoundland. The site is in Labrador, a part of Newfoundland Province.)

U. S. Steel's Quebec Cartier mining town is named Gagnon, after Quebec's Lt. Gov. Onesime Gagnon. Everything has to be hauled to the town over the railroad. In the beginning, a tote road was used from the St. Lawrence coast to the townsite. With the railroad completed, regular freight supplies the town, which will total 2000 when fully inhabited.

Good Homes Ready — Quebec Cartier took advantage of earlier experiences of Iron Ore of Canada in building employee homes. It was learned that to keep people happy far from civilization, good homes were needed. The company got a head start on home building. Result: When employees reported, homes were ready and waiting.

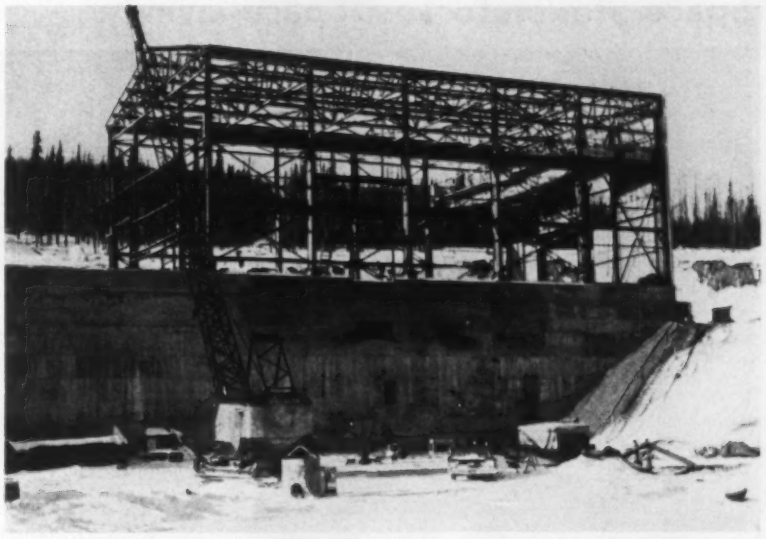
With its earlier experience, Iron Ore of Canada moved quickly with homes at Labrador City. Staff people are well-housed; dormitories for single men are well-equipped.

8 Million Tons—Quebec Cartier will ship about 8 million tons of ore concentrates a year. It will go to the U. S., Canada, and Europe.

The man-made harbor carved out of sheet rock of the St. Lawrence shore will be 50 ft in depth at low tide, protected from winds and tides. The Port Cartier harbor will be one of the deepest in Canada when completed.

Iron Ore of Canada will take its ore over a spur line it owns in conjunction with Wabush Iron Co. to its main line, the Quebec North Shore and Labrador Railway. From there, the ore will move south to Sept Iles, the terminal for all Iron Ore of Canada ore.

The Carol Lake project will ship about 7 million tons of concentrate, either as concentrate or mixed with Schefferville ore. Wabush Iron is expected to complete its plant near the Carol Lake project by 1965. That should mean another 5 to 6 million tons.



30-BELOW WORK: Iron Ore Co. mills went up though temperatures reached 30-below-zero. Here, concentrator begins to take shape.

NORTHERN HOMES: Good homes were a must at Iron Ore Co. of Canada's Carol Lake project. Good morale is a vital factor.

Lively Competition—There will be lively competition between all steel companies involved in the Canadian projects. U. S. Steel has served notice it will exploit the European markets. The same from Iron Ore Co. of Canada. Six U. S. steel companies control Iron Ore Co. of Canada.

Whether or not Quebec Cartier is a hedge for U. S. Steel's big Cerro Bolivar development in Venezuela is anyone's guess. The only people who really know are the company's directors.

Pace May Jump—Regardless of the correct answer, it has to be considered a hedge. If things get bad in smouldering South America, U. S. Steel could up its pace at Gagnon. There is vast room for expansion at Port Cartier and the question of concentrating capacity is easily solved—by building more of them.

Space Station to Test Space Living

COMFORTS OF HOME: Full-scale working model of a three-man space station is nearing completion at the San Diego plant of Convair (Astronautics) Div., General Dynamics Corp. It has a 10-ft dia. steel chamber with living and working compartments on two levels. Funnel-shaped re-entry chamber at the bottom is detachable for return to the earth. The "space apartment" is capable of duplicating all space conditions except lack of gravity. The model will be used in developing life-support systems — air conditioning, water regeneration, storage and preparation of food, etc.—when manned tests start later this year.

New Trade Policy: No Tools for Reds

If the Reds can use it for defense, they won't get it from the U. S.

This seems to be the new policy on trade with the Communists. It follows the mixup over a machine tool shipment to Russia.

The on-again, off-again case was settled when the Administration revoked the export license under which $1.5 million in grinding machines were bound for Russia. The Defense Dept. is buying the high speed ball bearing machines instead.

Unique Trade-In Plan Set For Toolmakers

A trade-in plan that could start a trend in machine tool selling has been launched.

Paul N. Stanton, marketing vice president, Pratt & Whitney Co., Inc., says his company will now accept used or surplus machine tools of any make as part payment or credit for new Pratt & Whitney products. A new unit of Fairbanks Whitney, the parent firm, has been formed to handle the trade-ins. It is called Machinery Trading Corp.

Separate Unit — The unit will store, recondition and sell all machines taken in trade by P & W. It will also enter the used machinery field, buying surplus tools. It will be a separate corporate unit.

Mr. Stanton notes that Pratt & Whitney spent $750,000 in 1960 for new equipment in a modernization program.

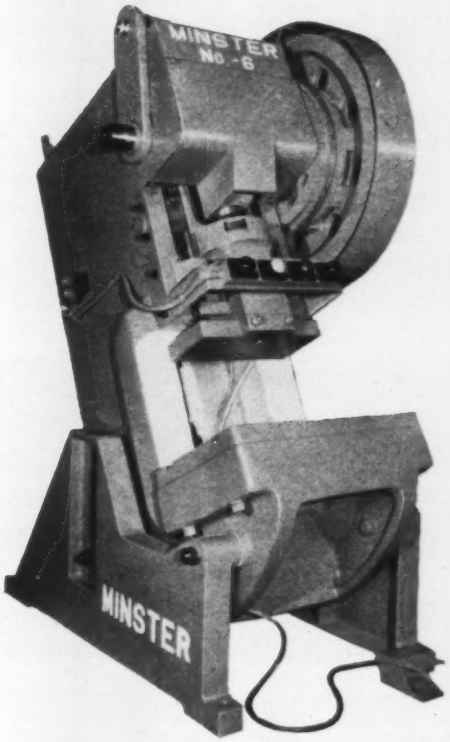
"We are convinced all of American industry must do the same to win today's battle for economic survival. Right now more than 60 pct of machine tools are more than 10 years old. And to meet competition from abroad, industry must find ways to reduce production costs."

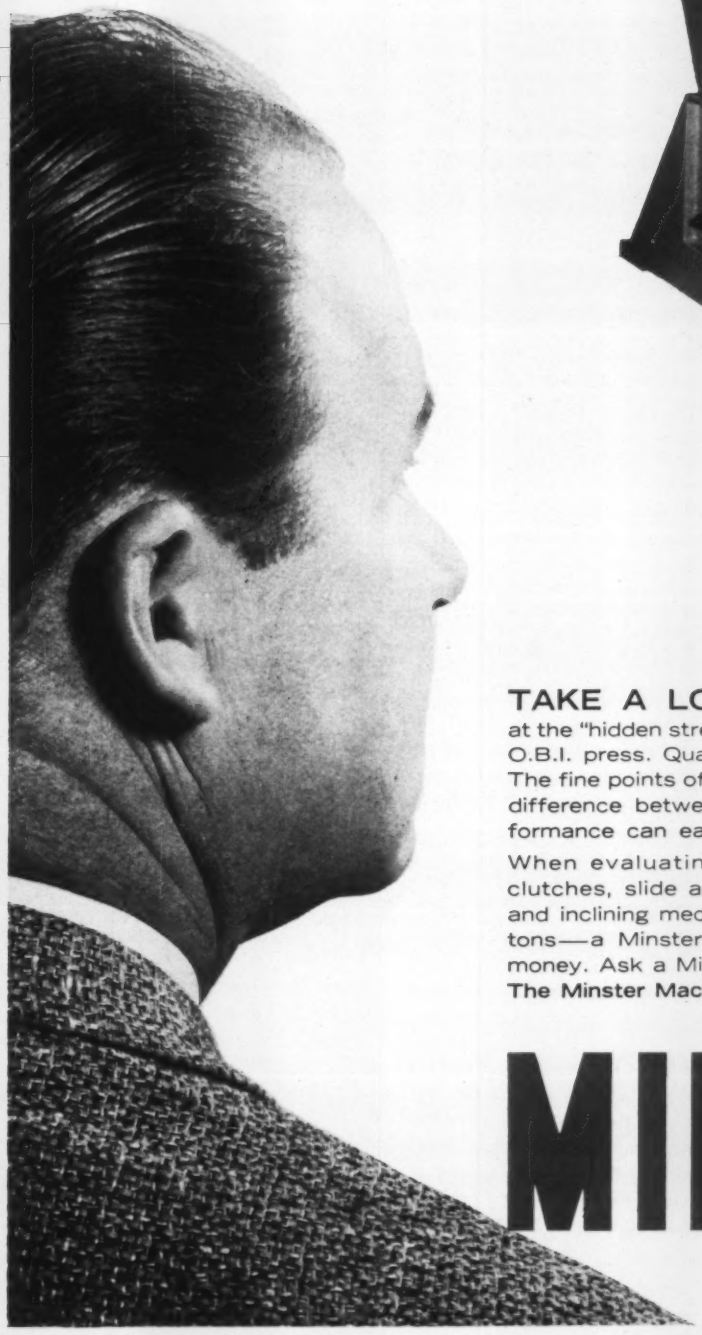
Tool "Supermarket"—Machinery Trading Corp. will be a "supermarket" for machine tools, says Mr. Stanton. It will allow companies to constantly upgrade equipment, improving design and efficiency.

"The need for modernization is serious," he says. "Its rewards in profit and growth are tremendous. Industry's 'balance sheet thinking' must change."

From Large to Small — Frank Reilly, former vice president of a New England used machinery firm, is vice president of the new unit. He says machines obtained from large U. S. plants will be resold to segments of industry where production runs are shorter and limited capital is available for new equipment. Their surplus machinery can then be resold to an entirely different level of industry, which also can upgrade facilities.

"We know the tremendous benefits of our new tools to huge companies where high overhead costs, labor fringe benefits and high quality runs require the ultimate in production machines."





TAKE A LONG, HARD LOOK

at the "hidden strengths and values" found only in a Minster O.B.I. press. Quality is not always visible at first glance. The fine points of design and construction which mean the difference between good performance and superior performance can easily be overlooked.

When evaluating O.B.I. presses, carefully compare clutches, slide areas, recirculating lubrication systems, and inclining mechanisms. On any size—16 through 250 tons—a Minster O.B.I. offers you more value for your money. Ask a Minster representative to prove it.

The Minster Machine Company, Minster, Ohio

MINSTER®

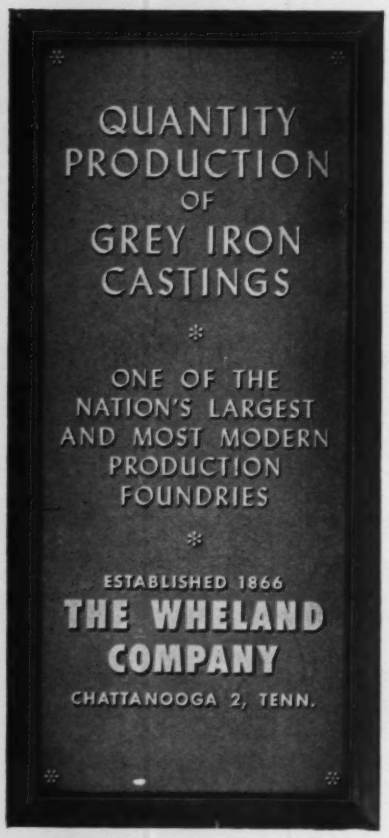
INDUSTRIAL BRIEFS

Bigger Base—Rezolin, Inc., Detroit, has moved to expanded facilities at Mt. Clemens, Mich. A new 7500 sq ft plant will produce formulated plastic compounds.

Aluminum, All — The world's first major all-aluminum office structure will be built in Los Angeles for Acme Metal Molding Co., a subsidiary of Northrop Corp. The 6800 sq ft building will feature innovations in the use of aluminum shapes and extrusions.

Plasma Pact — North American Aviation, Inc., has awarded a contract to Allis-Chalmers Mfg. Co. to design and construct a 1-megawatt plasma jet test stand facility. It will be located at El Segundo, Calif.

Modern Program—Firth Sterling, Inc., Pittsburgh, will begin a capital expenditure program for modernization and cost reduction. Projects include a continuous, controlled atmosphere annealing furnace and a new 18 in. cogging mill for the steel division.



Navy Contract—Burroughs Corp. has received a $1.3 million order for additional electronic computers for navigation systems in U. S. Navy nuclear-powered submarines. The contract for 10 units follows an original order for five of the stabilization data computers.

Polaris Work — Contracts for launching and handling equipment for five more Polaris-carrying submarines have been awarded to the Sunnyvale, Calif., manufacturing division of Westinghouse Electric Corp. Value of the new orders is $10 million.

Fibre Switch—Taylor Fibre Co., Norristown, Pa., has moved its Detroit sales office to the plant of Dytronics, Inc., a subsidiary.

Third Expansion—Liberty Electronics Corp. completed its third major expansion in five years with new administration and sales offices at Inglewood, Calif.

Aluminum Advance—The Heil Co., Milwaukee, has developed a new all-aluminum tank truck for food and chemical products. It is believed to be the first aluminum tank for pressure unloading.

Electronics Theme — Four seminars and speeches by Army and Air Force research experts will feature the Electronics Industries Assn. annual spring conference in Washington, March 14-17.

Improved Managing—The Industrial Management Society will present methods improvement awards at the Industrial Engineering and Management Clinic in Chicago, November 1-3.

Canadian President—R. R. McNaughton of Trail, B. C., is the first Canadian to become president of the American Institute of Mining, Metallurgical and Petroleum Engineers. He succeeds Dr. Joseph L. Gillson of Wilmington, Del. James C. Gray, Pittsburgh, is the new president of the AIME's Society of Mining Engineers. New president of the AIME's Metallurgical Society is J. S. Smart, Jr., of New York. Earl M. Kipp, San Francisco, heads the Society of Petroleum Engineers of the AIME.

AIME Program—A high temperature materials conference is scheduled for Cleveland, April 26-27, sponsored by the American Institute of Mining, Metallurgical and Petroleum Engineers. Eight technical sessions are on the agenda.

Top Diecasters — John L. MacLaren, New York, is the new president of the Society of the Die Casting Engineers. Earle W. Rearwin, East Longmeadow, Mass., is vice president. M. R. Tenenbaum, Cleveland, is secretary, and Lee G. Axford, Detroit, is treasurer.

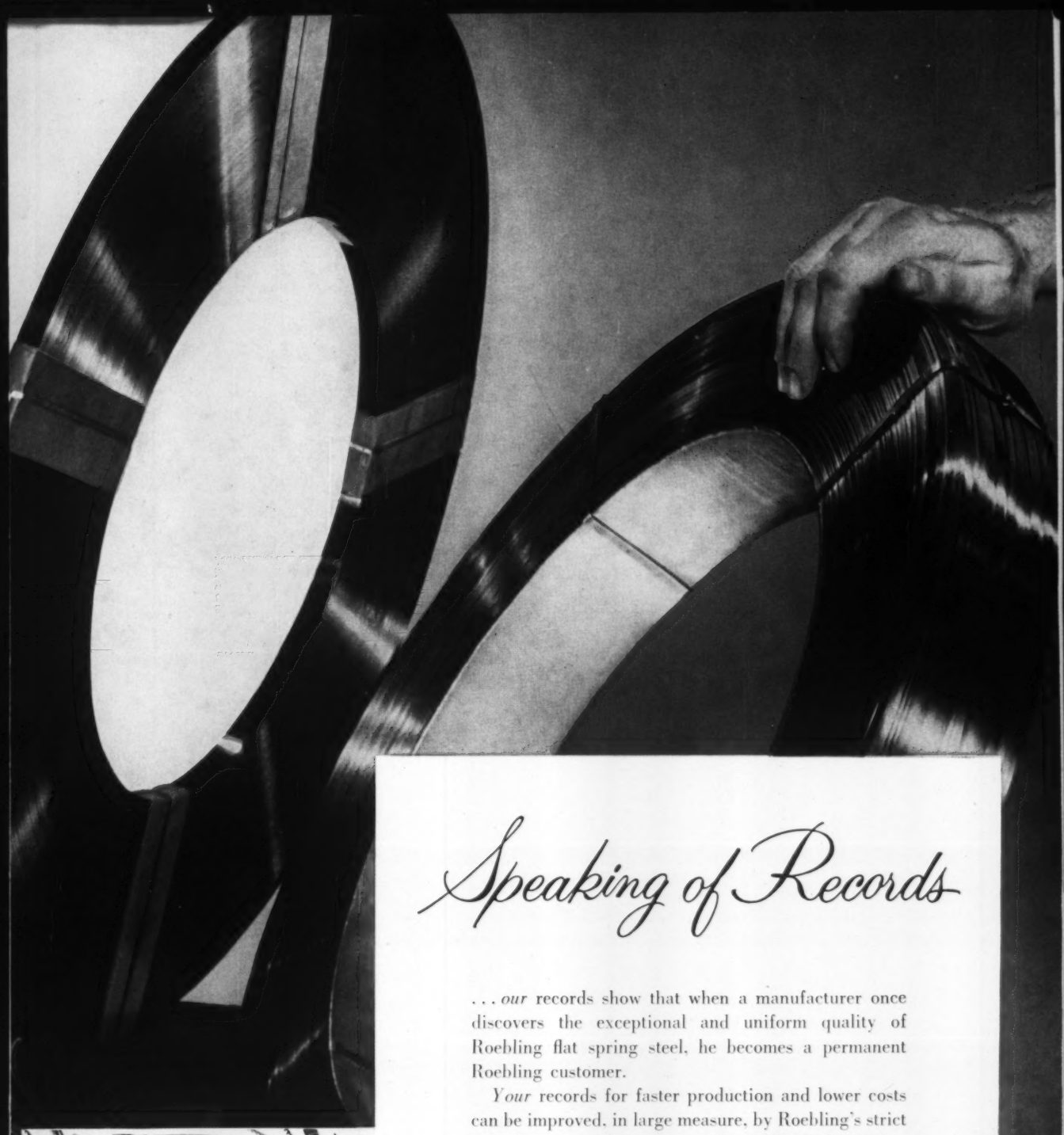
Aluminum Leaders — John W. Douglas, president of Republic Foil, Inc., Danbury, Conn., is the new president of the Aluminum Assn. Named directors-at-large are Irving Lipkowitz, New York; Louis Lippa, Chicago; and D. A. Rhoades, Oakland, Calif. Vice presidents are Richard L. Allen, Bridgeport, Conn., and Mord Lewis, Louisville, Ky.

Metals Speaker—Charles H. Winship, New York, will address the metals session at the annual National Assn. of Secondary Material Industries convention in San Francisco, March 13-14.

Metal Lath Heads—Maurice K. Brown, Boston, is the new president of the Metal Lath Manufacturers Assn. Lewis C. Hollerback, Wheeling, W. Va., is vice president.

Metals Award—Robert B. Heppenstall, president, Midvale - Heppenstall Co., Philadelphia, is the winner of the forging industry's William Hunt Eisenman Medal of the American Society for Metals.

First Phase—Pennsalt Chemicals Corp. has moved its sales technical service groups to expanded laboratory facilities at King of Prussia, Pa. The new two-story building is the first unit of the company's planned $6 million Technical Center.



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Your records for faster production and lower costs can be improved, in large measure, by Roebling's strict attention to supplying you with the finest flat spring steel available. When you need flat spring steel, specify Roebling. Write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey, for complete details.

These are typical of the many types of quality parts produced from Roebling flat spring steel.

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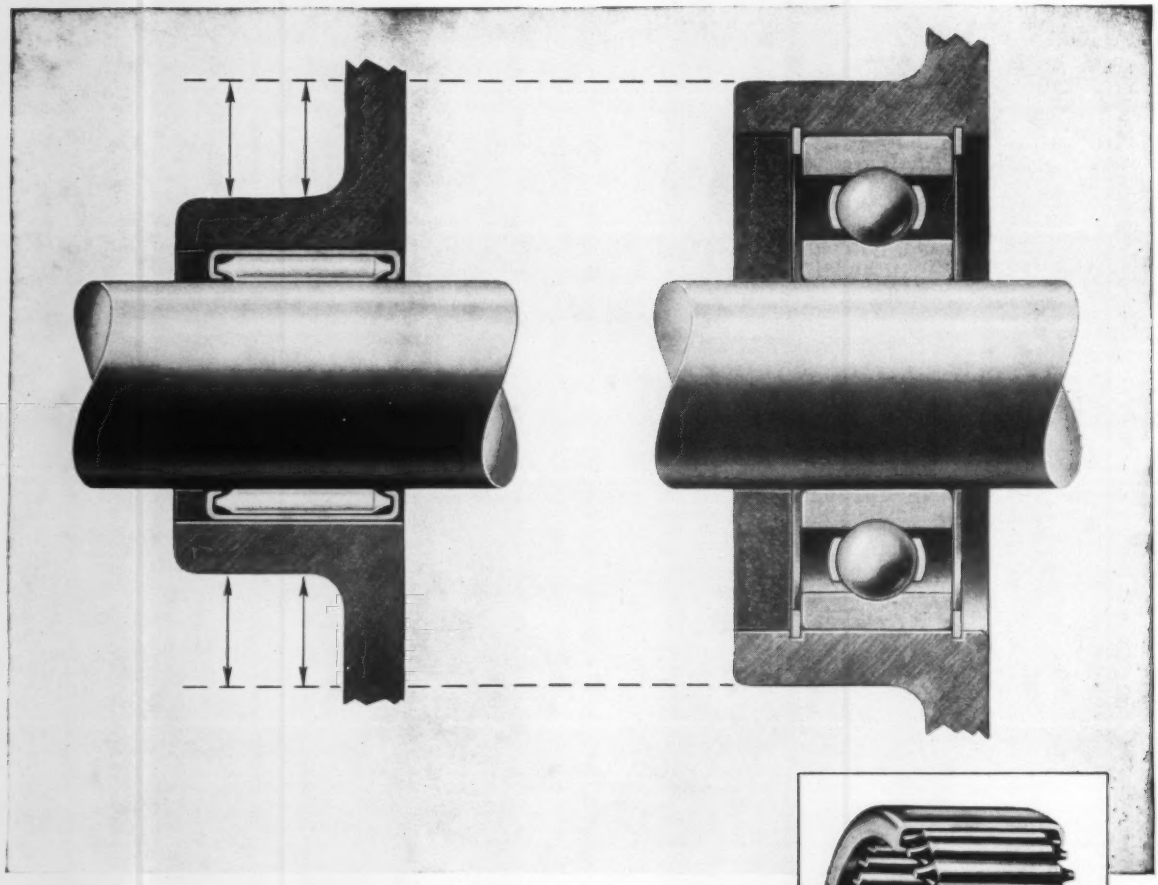

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Simpler, more compact design is possible wherever Torrington Needle Bearings are put to work in eliminating friction problems.

These outstanding bearings offer a higher radial load capacity than any other bearing of comparable size. They are more compact, lighter in weight, and are lower in unit cost. The full complement of small-diameter precision rollers insures exceptional antifriction performance and long, maintenance-free service life. The turned-in lips on the outer shell guarantee positive roller retention. Installation and assembly are fast, simple, economical.

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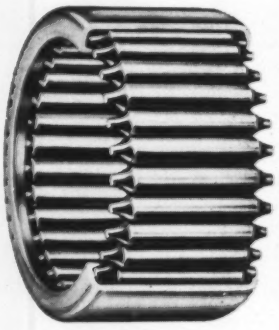

TORRINGTON NEEDLE BEARINGS FEATURE:

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- Unequalled radial load capacity
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- Low unit cost
- Long service life
- Compactness and light weight
- Run directly on hardened shafts
- Permit use of larger and stiffer shafts

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How Typical Is This Recession?

Present business slowdown, now in its tenth month, has outlasted the short, but sharp slump in 1957-58.

Some differences show up when present recession is compared with the two previous postwar downturns.

■ Is the present recession following the typical pattern for business turndowns? How does it compare with previous recessions?

Evidence shows that, so far, it has been milder in some aspects than the declines of 1953-54 and 1957-58. But, at the same time, it may be as severe as the two preceding ones. The reason: It started with economic activity at a lower level relative to capacity.

Passing '58—According to studies by the National Bureau of Economic Research, the recession was in its ninth month in February. This assumes the slowdown began in May, 1960. The nine-month span equals the length of the 1957-58 slump, which was the shortest, but sharpest of postwar recessions.

The drop in business during 1953-54 lasted 13 months. The length of the three most recent downturns compares with an average of 16 months for recessions since the 1880's. The longest, of course, was the depression which began in 1929.

How Far Down?—But how severe is the current business slowdown?

The Federal Reserve Bank of St. Louis has drawn some comparisons. The Bank also selected May 1960 as the beginning of the 1960 recession. The other turning points used were July 1953 and August 1957.

Here's what the analysis shows:

Industrial Production: The rate of decline in output through January was smaller than comparable periods of the previous two recessions. It was measured at a 7 pct decline, compared with 10 pct in 1953-54 and 14 pct in 1957-58. Each of the previous recessions brought an abrupt initial drop in production. However, the current recession, seemed to ease into the decline.

For example, the Industrial Production Index (seasonally adjusted) took from January to November to drop 6 points.

Unemployment: The number unemployed went up from less than 5 pct of the labor force in May 1960 to about 6.5 pct this January. This rise, either in terms of the total or a percentage of the work force, wasn't as sharp as in the previous recessions.

But, the Bank points out, the change should be measured from the larger base when it began.

Gross National Product: Total output of goods and services (seasonally adjusted, annual rate) went down less than 1 pct between the second quarter '60 and the fourth quarter. The decline over the first two recession quarters was less than in the two previous slumps.

Exports Remain Bright Spot

■ "Strong spots in the economy continued to be exports, consumer purchases of services, some nondurables, and government demand." That's the comment of the Commerce Dept. in its latest survey of the business situation.

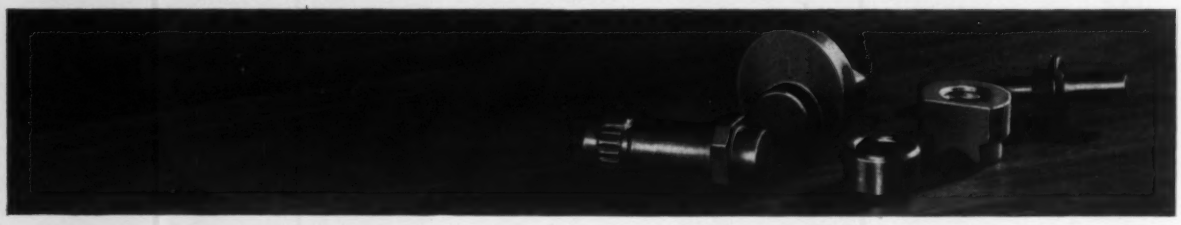
Holding the Pace—The health of the export market, combined with a more aggressive approach to foreign trade by U. S. companies, is indeed encouraging. Total exports (seasonally adjusted) were $1.5 billion in December 1959. Since April 1960 they have hovered around a monthly $1.6 billion, the total for December 1960.

There's evidence, too, that U. S. manufacturers are moving vigorously to step up their export efforts. Local trade groups, encouraged by the government and Chambers of Commerce, are interesting more companies in exporting.

Delegate and Study—Companies are assigning management men exclusively to export sales. Those who have been in overseas markets are sharing their knowledge with newcomers. In some cases, it only needs to be pointed out rumors about trade difficulties are untrue.

In any event, investigating export markets is worthwhile.

Gains special part at half cost



RB&W survey seeks out ways to economize with cold formed special parts as well as with standard fasteners

Standard fasteners and many cold formed parts are closely related. They're offspring of the same machine. When called in to survey fastener usage, therefore, the RB&W Man can also ferret out those special parts which could be produced faster and for less money on RB&W's cold headers or nut formers.

The hand-held part above, for example, is a car trunk hinge spacer. Its cost was cut 50% when RB&W cold-formers took on the job of pounding them out at high speed, smoothly finished, and ready for installation.

By buying such parts, instead of making them, you save in one or more ways. (1) There's less machining time—or none at all. (2) Assemblies of several small pieces can be made as a unit—reducing assembly costs. (3) When shape of piece is such that you would have to machine excessively from relatively large diameter rod, you avoid heavy scrap loss. Sometimes cold forming becomes the *only* way to economically produce a piece—as for example, the eccentric cam shown above.

To get the most from your dollar in standard fasteners or specials, find out what the RB&W Fastener Specialist can do in cooperation with your engineers. Or write about your requirements in special parts directly to Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N.Y.

RB&W

116th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Sales office and warehouse at:** San Francisco, Calif. **Sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas. **Sales agents at:** Cleveland; Milwaukee; New Orleans; Denver; Fargo. **Distributors coast to coast.**

Engineers Advance Gas Turbine

Chrysler Claims Fuel, Braking Problems Overcome

The gas turbine engine has been a pet of auto engineers.

Chrysler Corp. says it has licked some nagging obstacles with its new compact package. By A. E. Fleming

▪ Since World War II the gas turbine engine has been a pet of automotive engineers. Every year some company announces a new development.

The latest revelation comes from Chrysler Corp.: A compact package that engineers claim has licked the nagging problems of low speed and part-load fuel consumption, engine braking, and time lag between accelerator pressure and full-power engine response.

"Variable Nozzle" — Chrysler's solution involves a "variable nozzle" system. The gas turbine uses hot gas to spin the turbine wheel which powers the drive-shaft. Before the gas gets to the turbine wheel it moves through 23 vanes which direct the gas at the turbine blades.

Until now the vanes were fixed in one direction. Gas flowing through the nozzles was always the same whether the car was idling, accelerating or going downhill with the engine idling. Fuel consumption was ruled by the amount of gas that poured uncontrolled between the fixed nozzles.

Greater Efficiency—Now Chrysler engineers have come up with nozzles which open and close depending on power requirements. Efficiency is greater, they claim.

Chrysler's new gas turbine requires a space 36 in. long, 35 in. wide and 27 in. high. Weight is under 450 lb. Horsepower is 140.

Not in Production—Large scale production of the engine for cars is not in the near future. Apparently only one a month can be built at quite a high price.

But Chrysler has the turbine ready for experimental use and will offer it to certain selected customers on a negotiated basis for experimental purposes.

Around its latest of three gas turbines, Chrysler has designed an "idea" car called the Turboflite.

With a body by Ghia, of Turin, Italy, the Turboflite flaunts these ideas: a glass canopy; side windows that pivot outward at the bottom instead of dropping into the doors; a rear-end deceleration airflap suspended between two stability struts, the flap pivoting upwards into the airstream when hydraulic brakes are applied; outer headlights that duck into the fenders when not in use.

Seiberling offers Nylon-Rayon Tire

Now Seiberling Rubber Co. has developed the rubber industry's first tire combining nylon and rayon. Distribution will start in April of a tire with two plies of nylon on the outside and two of rayon on the inside.

Seiberling claims the combination eliminates the flat-spotting characteristic of nylon tires, which produces a temporary thumping in cars which have stood for awhile.

RAISING THE ROOF: Chrysler's latest gas turbine engine test vehicle, the Turboflite, incorporates many other new ideas. For easy entry or exit the entire glass canopy raises when the door is opened.

Heller nucut *American Pattern* Files

SMOOTHER FINISHES COME FASTER when Heller NUCUT Files sink their double-acting, non-tracking teeth into the work. While coarse teeth are chewing off metal with less pressure and fewer strokes, fine teeth add the finishing touches. Wavy grooves formed by irregular tooth size and spacing break up chips, minimize loading, reduce chatter. Fewer files are used. Files last longer. Filing time and costs are lower than ever before.

SEEING IS BELIEVING! Test Heller NUCUT Files with "Wavy-Teeth" against any other brand. You'll find, size for size and cut for cut, no other file cuts so fast and lasts so long as a Heller. Your nearby Heller Distributor stocks Heller Files in every type, shape, size and cut you'll ever need for faster, better filling at lowest cost.

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Coast Steelmakers Optimistic

Construction Should Be Spring Sales Tonic

Steel industry executives on the West Coast say that the market is showing signs of life.

They expect business to pick up soon, with a big assist coming from heavy construction.
By R. R. Kay

■ What's the steel outlook on the Coast? Here it is, as three steel company top executives see it.

One says, "We feel better about the outlook. Our order books are showing some signs of life. I'm more optimistic than I've been for four or five months.

"We see an upturn for spring in heavy construction projects. Many of our customers say their inventories are now at workable levels. This should mean mill purchases for future needs instead of living off the shelf."

Another pretty much agrees: "We think we see the bottom of the curve. Business should be moving up soon."

The third, also a major steel producer, doesn't think things look so rosy. He says his company's business right now "is only five per cent better than in the fourth quarter of last year. However, there's more electricity in the air than there's been for quite a while. But so far, our order books are not sparkling."

"Contractor Teams" Line Up for Space Age

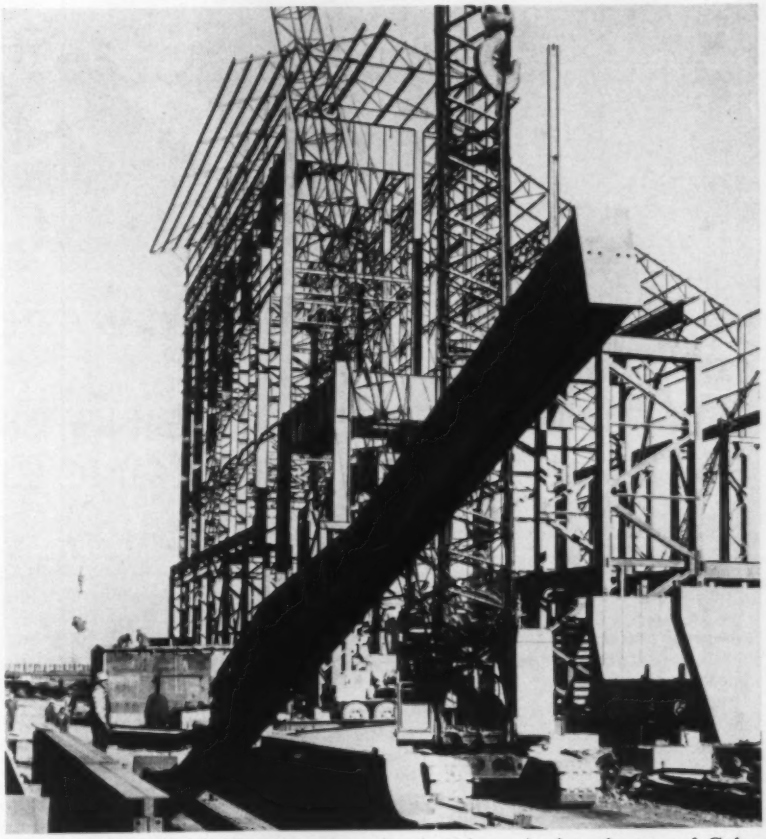
You'll see more and more of "contractor teams" selling the Defense Dept. This trend points the way to successful marketing in the aerospace industry.

Garrett Corp.'s W. J. Pattison, vice president-sales, says, "By inter-company cooperation, . . . prime and subcontractors are able to develop and sell products broader in scope, so under in concept, and perhaps even lower in cost."

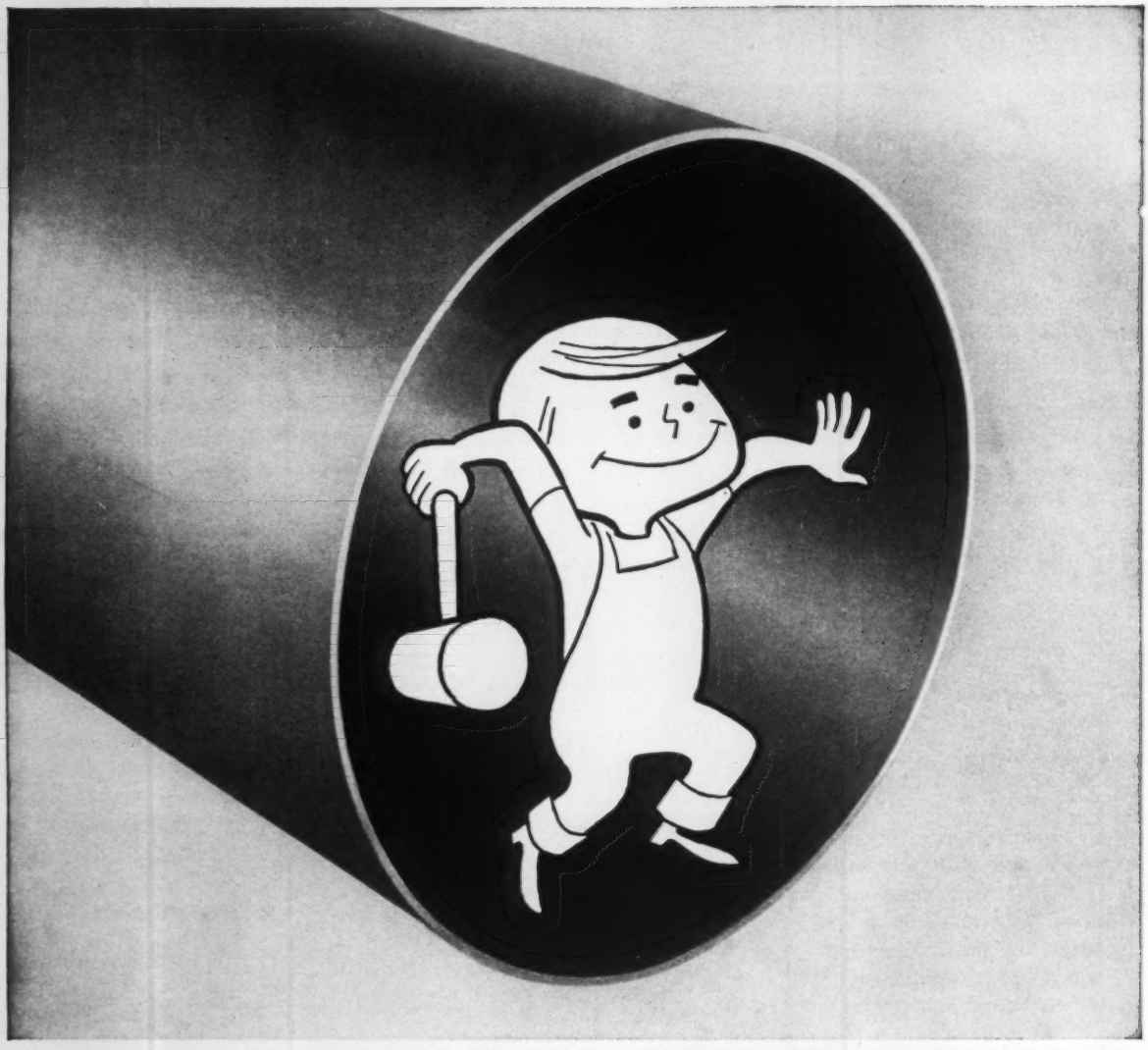
There's a real need for the team approach today. Major defense programs are fewer. But each program is immense in technological scope.

Spread Formation — Contractor teams are usually spread throughout the country. Example: Boeing in Seattle heads up the Minuteman project. The team includes Thiokol, Brigham City, Utah, for the first stage propulsion engine; Aerojet-Sacramento, Calif., for second stage; and Hercules Powder, Baccas, Utah, for third stage.

Steel Mill Takes Shape in Colorado



ON THE WAY UP: Heavy steel section is being raised to the top of Colorado Fuel and Iron Corp.'s new oxygen steelmaking shop at the Pueblo Plant. When completed this month, the plant will have a steelmaking capacity of 50-70,000 tons of steel per month.



"The Gravity Kid" shows why

CONTOUR-WELDED TUBING OFFERS GREATER FATIGUE STRENGTH, LONGER SERVICE LIFE

Tubing fatigue strength depends largely *on how the tube is welded,* and the results obtained. Tubing that's smooth inside – free of flaws and bulging weld beads – offers much greater fatigue strength and longer service life.

Contour-welded* *tubing is smoother inside* than conventionally-welded tubing. It's smoother because *it's welded at the bottom.* Gravity pulls the metal down so that the weld corresponds to the tube's inside contour. There's no bulge on the inside surface. Even on the outside, the seam closely conforms to the tubing shape.

Contour-welding provides greater strength than conventional welding, because in conventional welding, gravity pulls the molten metal down into the tube. This can form a bead that is difficult to remove by cold working. And cold working can lead to deep, sharp undercuts that seriously weaken the tube.

Contour-welded tubing is smoother than seamless, too. That's because it's formed from uniformly rolled strip steel; whereas, seamless is produced by extruding or piercing. This strip is 100% inspected. So, there are no undetected tears or fissures inside.

See for yourself why Contour-welded tubing offers greater fatigue strength, longer service life. Write today for our free 48-page manual which describes tubing sizes from 1/8″ to 40″ O.D., in stainless and high alloy steels, titanium, zirconium, zircalloy, and Hastelloy**.

*U.S. Patent 2,716,692

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New Orders Stumble in January

But Fall Is Cushioned by Foreign Demand

Metal cutting machine tool orders in January fell 26 pct from the previous month.

But the drop would have been much more severe if foreign orders had not showed up well.
By R. H. Eshelman

■ With data in for the first full month of 1961, it's apparent that the machine tool industry faces a "more of the same" situation. No sharp upturn is expected soon. Foreign orders are buoying the market.

As expected, the trend of metal cutting machine orders turned down in January with general business conditions. Net domestic new orders dropped to $20,550,000. At the same time, further slump was cushioned by a good showing in foreign cutting tool orders—$14.5 million for the month.

Profit Margin—Still, the total for January declined some 26 pct. The backlog in this category is now estimated at about 4.4 months. Some industry executives say this short delivery time is a big factor in rising foreign orders. One machine builder reported not long ago that 45 pct of his orders are now going abroad. This was attributed to the long delivery times being quoted by European machine makers.

Another builder of general type machines says, "This nugget of business is proving the margin between profitable operations and a losing proposition for many of us." He feels that this continued support is covering up the bad situation in the industry orders here at home.

Hesitate at Home—"We continue to get many foreign orders because we can offer delivery in 30 to 60 days, as compared to quotations from European machine people of 18 months to 2 years. That means a plant can install the new machine and make it pay for the cost differential over that period of time."

In general purpose machines, few tool executives can foresee any immediate reasons to expect an upturn this spring. One Midwest representative said, "Actually, we now note a bit more hesitancy. There are continued delays in placing orders despite considerable interest in new equipment and, in fact, a lot of inquiries, many of which result in quotations."

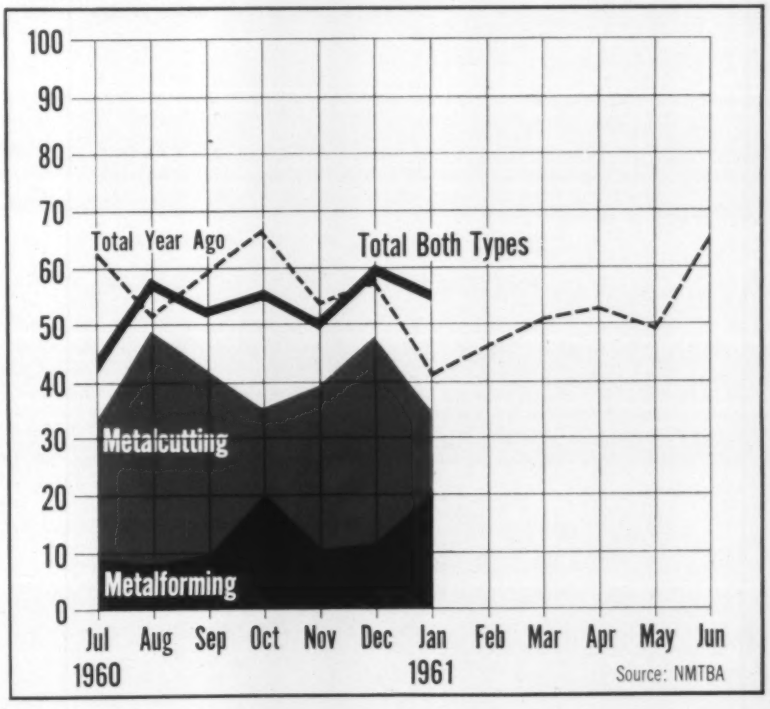
Ride With Autos—On the other hand some builders of special machines are looking for at least more business in the coming months as a result of automobile programs in the wind.

General Motors has already announced expansion plans in plant and equipment in 1961 to the tune of $1.5 billion. Some of this has already been allocated and is reflected in the forming tool orders.

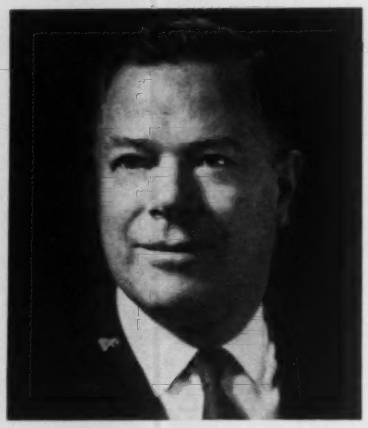
Forming Tools — For January the domestic orders took a sizable jump to $16.45 million. Foreign orders for the month tallied some $3.65 million. So the total makes the best reading of any month since last October.

MACHINE TOOLS–NET NEW ORDERS

In Millions of Dollars — Metal Cutting and Forming Types



MEN IN METALWORKING



J. W. Mollek, Jr., elected president, KPT Mfg. Co., Roseland, N. J.

Rockbestos Wire & Cable Co., Div. of Cerro Corp.—**A. H. Macgillivray,** appointed works manager.

The Parts Div., Sylvania Electric Products Inc.—**J. W. Parks, Jr.,** appointed field sales manager; **W. L. Bentz,** district sales manager, Southeast; **R. S. Kelly,** district sales manager, metropolitan New York; **R. A. Wilson,** salesman, Indianapolis.

Link-Belt Co. — **R. W. Hanna, Jr.,** appointed manager, Pittsburgh district office and warehouse.

R. J. Heggie, elected president, A. M. Castle & Co. He succeeds J. M. Simpson who has been elected chairman of the board.

The Chicago Screw Co., Div., of Standard Screw Co.—**R. M. Kure,** promoted to plant controller.

The Hickok Electrical Instrument Co.—**John Kushan,** named director, material.

The Dow Chemical Co.—**W. J. Rave,** named manager, Metals Dept.; **H. A. Humble,** appointed sales manager, Metals Dept.

Consolidated Aluminum Corp.—**Fred Jones,** appointed Chicago district sales manager.

Dresser Manufacturing Div., Dresser Industries, Inc. — **E. B. Carey,** appointed director, marketing.

International Div., Bucyrus-Erie Co.—**J. A. Rossi,** appointed export sales manager.

General Electric Co. — **J. C. Mogavero,** appointed manager, metal production operations, Metallurgical Products Dept., Detroit.

Oliver Iron Mining Div., U. S. Steel Corp.—**W. E. Cotter, Jr.,** appointed manager, sales.

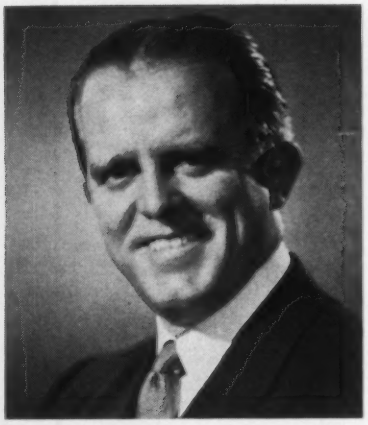
Federal-Mogul Div., Federal-Mogul-Bower Bearings, Inc. — **H. H. Kietzer,** appointed sales manager; **T. J. Marshall,** promoted to director, market research and planning.

Minneapolis-Honeywell Regulator Co. — **J. E. MacConville,** appointed sales coordinator, Special Systems Div.; **F. B. Akerson,** named regional industrial sales manager, Atlanta.

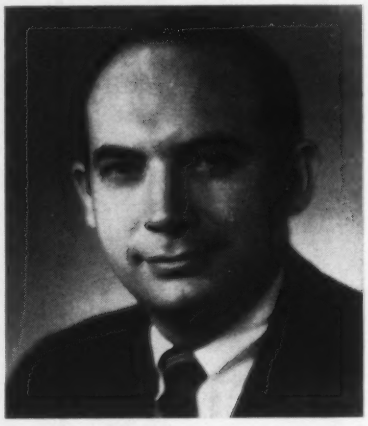
International Business Machines Corp. — **J. R. Opel,** promoted to director, communications, corporate staff.

Eutectic Welding Alloys Corp.—**W. C. Joerger,** named district manager, South Niagara Frontier, N. Y.

(Continued on P. 78)



L. C. Barr, elected president, Eutectic Welding Alloys Corp. He succeeds R. D. Wasserman, who has been elected chairman of the board.



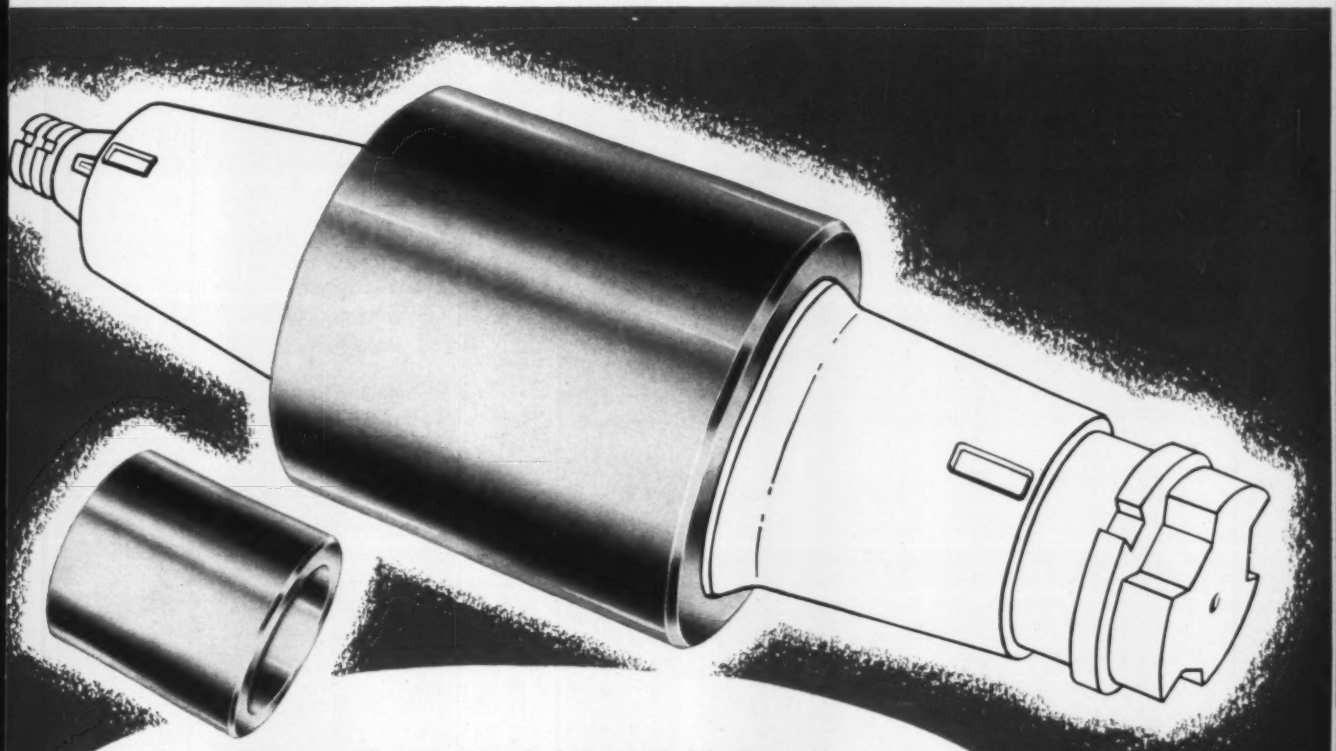
C. J. Brown, named executive vice president, Stainless and Strip Div., Detroit, Jones & Laughlin Steel Corp.

E. N. Harris, elected vice president, sales, Bohn Aluminum & Brass Corp., Detroit.

Ohio

FORGED SLEEVES

and Cast Steel or Forged Steel Arbors for Back-Up Rolls



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Ohio back-up roll body sleeves are forged and hardened from *balanced alloy vacuum poured degassed steel.* These sleeves are accurately machined and applied to either new or used forged steel or cast steel arbors.

Yes, Ohio Steel offers a complete back-up roll service. Ask your Ohio roll sales engineer about this modern facility that can help increase rolling mill efficiency.

THE OHIO STEEL FOUNDRY COMPANY
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OHIO IRON and STEEL ROLLS

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Ohioloy Rolls	Double-Pour Rolls	Nickel Grain Rolls
Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

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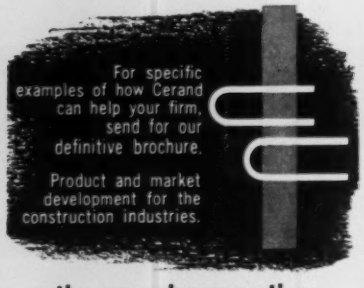
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(Continued from P. 76)

Pressed Steel Tank Co.—**H. E. Brumder,** elected president; **Herman Merker,** elected chairman of the board; and **W. L. Killen,** vice president, manufacturing and engineering.

Hayes Steel Products, Ltd.—**R. C. McPherson,** elected president.

Size Control Co., Div. of American Gage & Machine Co.—**P. J. Sommer,** appointed vice president and general manager; **T. J. Owen,** appointed vice president, manufacturing; and **F. J. Vlasaty,** to sales manager.

North American Aviation, Inc.—**J. J. Roscia,** elected vice president and general counsel.

White Pine Copper Co.—**R. C. Cole,** named executive vice president and general manager.

Crucible Steel Co. of America—**G. W. Snyder,** appointed asst. to the vice president, commercial, and director of production control.

General Electric Co.—**M. S. Richardson,** named sales manager, industrial furnaces, Industrial Heating Dept., Shelbyville, Ind.

Miles Metals Corp.—**Dr. Joseph Zimmerman,** formerly editor-in-chief, Daily Metal Reporter, named a consultant.

The Osborn Mfg. Co.—**E. P. Fisher,** appointed manager, finishing machine sales.

DeVlieg Machine Co., Machine Tool Div.—**R. M. Miller,** promoted to asst. sales manager.

Minneapolis Electric Steel Castings Co.—**Carter DeLaittre,** elected vice president and works manager; **A. D. Moll,** elected vice president and sales manager.

The Union Metal Mfg. Co.—**K. C. Dorland,** appointed general sales manager.

Chromalloy Corp.—**Q. A. Nettleton, Jr.,** named asst. treasurer.

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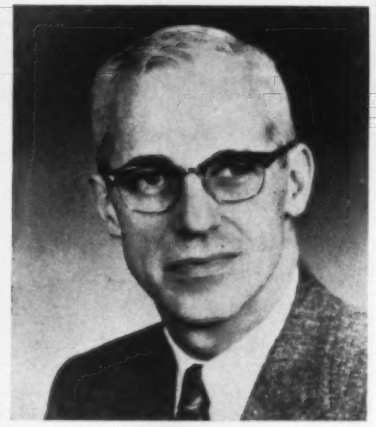
The Carborundum Co., Research and Development Div. — **W. R. Benn,** appointed manager, Market Development Dept.

J. A. Johnson, appointed vice president, research and engineering, The Nylok Corp., Paramus, N. J.



William Sivyer, elected vice president, engineering equipment group, Chain Belt Co., Milwaukee.

De Laval Steam Turbine Co.—Capt. **Ivan Monk,** USN (Ret.), becomes manager, Service & Repair Dept.

The A. P. Green Fire Brick Co. —**J. Q. Lewis,** appointed manager, Birmingham branch.

Axle Div., Eaton Manufacturing Co.—**C. D. Christie,** appointed asst. general manager; **W. S. Hammel,** named sales manager.

Archer-Daniels-Midland Co., Federal Foundry Supply Div.—**R. M. Gregory,** appointed West Coast manager.

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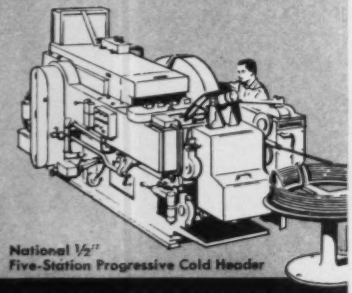

National ½" Five-Station Progressive Cold Header

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HARTFORD DETROIT CHICAGO

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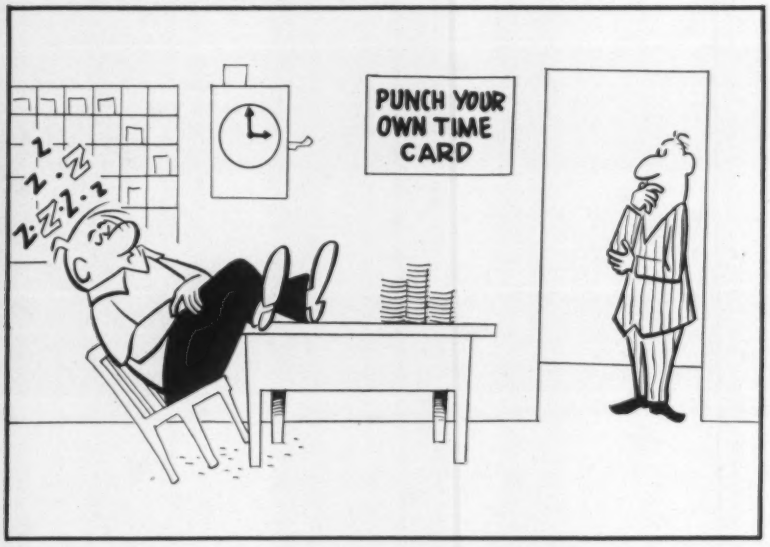


No Time for Vincent

▪ During contract talks, management and the union agreed that in case of extended layoff for lack of work, salaried employees would get one or two weeks of separation pay. These salaried workers, represented by the same union, were in a unit separate from that of the production workers.

Late in 1958, production workers struck. The agreement covering salaried employees still had a year to run, so they didn't join the walkout.

Time to Kill — When general production halted, some salaried workers were left with nothing to do. One of these was Vincent C., a timekeeper. He was laid off and told not to report back until the strike was over.

Vincent thought he would get a week's separation pay. Management didn't see it that way. "You weren't laid off for lack of work," the industrial relations director explained. "There's plenty of work on hand but we can't do it because of the strike. The contract doesn't call for separation pay under such circumstances."

This argument didn't appeal to Vincent. He filed a grievance which eventually went to arbitration under the Rules of the American Arbitration Assn. How would you rule?

The Arbitrator Ruled:

He said Vincent was laid off "for lack of work" within the meaning of the agreement. A lack of work may result from many circumstances, he said, some within and some outside management control. In this case, the company found it economically unfeasible to provide the timekeeper with work. Since Vincent was a timekeeper "without any time to keep" he was entitled to his separation pay.

From the files of
The American Arbitration Association

"You Arbitrate It!" appears in the second issue of The IRON AGE each month. Look for it in the April 13 issue.

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

EF

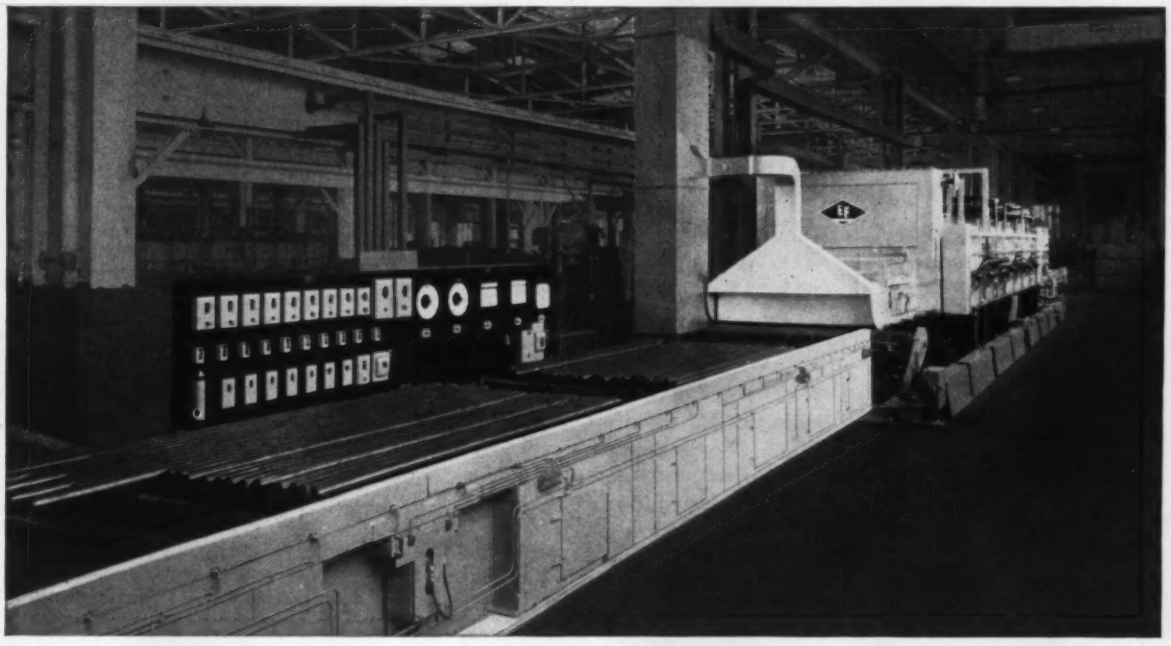
Roller Hearth Furnaces

for bright and scale-free annealing copper and copper alloy, wire, rods, bars, tubing and other non-ferrous and ferrous products.

The EF direct gas fired, forced circulation, roller hearth annealing furnace pictured below anneals 10,000 lbs. of ⅜″ to 6″ O.D. copper or copper alloy tubing per hour; lengths up to 36 feet, temperatures from 275°C. to 850°C.

Non-ferrous and ferrous wire, rods and bars are also frequently heat treated in furnaces of this type. When closer atmosphere control is needed, EF roller hearth furnaces of generally similar design are furnished either electrically heated or radiant tube fuel fired. EF specially designed run-out tables simplify inspection, sorting, boxing or strapping for shipment.

You will find it pays to call the EF engineers for any annealing, normalizing, hardening, carburizing, nitriding, carbon restoration, coating, brazing, sintering or other heat treating requirement. Our wide experience and extensive research and development facilities are plus values that can shorten your path to low cost, profitable operation.



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Your final steel cost must include both

What goes into *final* cost of steel? Maybe more than you realize. After you know the initial price, figure the further costs of possession. Often hidden and unnecessary, they include the costs of storing, handling and readying your steel for use. Costs your steel service center can often help you reduce or eliminate—to keep your steel costs *low*.

Each steel user's case is different. Ask your steel service center to help you determine the most economical way to buy steel. They will give you a helpful guide for figuring all your costs of possession, such as:

Cost of capital:	Cost of operation:	Other costs:
Inventory	Space	Obsolescence
Space	Material handling	Insurance
Equipment	Cutting & burning	Taxes
	Scrap & wastage	Accounting

Call your nearby steel service center, or write for free booklet, "What's Your Real Cost of Possession for Steel?"

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Steel

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Hot Squeeze for Atoms

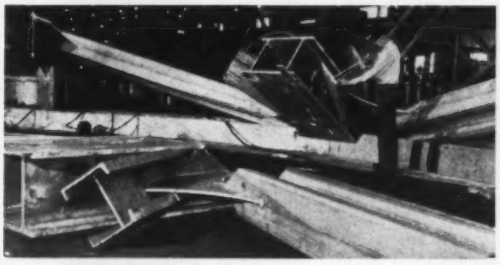
The Air Force can now create 2.2 million psi in environments up to 6000°F. The equipment will deform atoms. Pressure is great enough to change physical properties of metals. Bismuth, for example, has been made in at least eight different physical types. Equipment is also used to make diamonds and some ceramic materials.

Seals From Skeletons

Seals to withstand 1200°F and pressures up to 5000 psi can be machined from a new composite of porous, fiber metal impregnated with a soft metal. The fiber-metal skeletons, usually of molybdenum or stainless steel, can be made as dense as desired. Thus, they can be tailored to meet different seal applications. In one test, hydraulic fluids were retained for a total of 93 hours and 336,984 impulse cycles at 1000°F.

Giant Aluminum "Ear"

A giant radio telescope to help chart the heavens is being readied. To support the 140-ft diam dish-type antenna, a massive aluminum superstructure has been fabricated. About 60,000



SUPERSTRUCTURE: To track "hot spots."

lb of aluminum structural components went into the all-welded framework. The radio telescope will be rotated by large hydraulic motors to keep radio "hot spots" always in view.

Pare Aerospace Costs

Economy measures by 28 out of 70 firms surveyed in the aerospace industry have brought about cost reductions totaling $570 million. Reported savings accrued from such management techniques as improved purchasing and procurement, value engineering, and modernization. One company, for example, reported cost-reduction ideas over a three-year period had resulted in documented savings of nearly $18 million.

Bearings to 0.000020 In.

Precision bearings with 14 vital dimensions held within 0.000020 in. are now being made in production lots. This "giant step" in bearing technology is the result of an Air Force sponsored

BEARINGS: 200 steps to precision.

program to develop bearings for ICBM guidance systems. Making a bearing takes about 200 manufacturing, assembly and inspection steps before shipment in lint-free bags.

Forecast Nuclear Rockets

Flight tests of nuclear-powered space rockets has been forecast for 1966 or 1967 by H. D. Finger, chief of the Space Nuclear Propulsion office. He says nuclear propulsion rocket work has had "astounding successes." Mr. Finger also reports that NASA and the AEC hope to select an industrial development team for the nuclear rocket within the next two or three months.

More Power for Space

One of major barriers to outer space, especially manned vehicles, is lack of suitable power sources, say experts. Hence, the drive on unconventional propulsion devices. Step-by-step development of new power techniques will continue to take huge sums for research but industrial technology in other areas will also profit.

NEW WAY TO TEST YOUR PRODUCTIVITY

Now, Rotor Field Engineers can come into your plant and give you a far more complete testing of your air grinder productivity.

The new Rotor Portable Tool Comparator shown in use, measures efficiency under load conditions. Hence, it permits a far more practical appraisal of your productivity. This new method gives factual data for decision to repair or replace existing tools and whether new tools will pay for themselves.

Your Rotor Field Engineer will bring a Comparator Kit into your shop for a productivity test of your air grinders, or show you how to do this yourself. Write for your "Portable Tool Productivity Analysis". There is no obligation. The Rotor Tool Company, 26300 Lakeland Avenue, Cleveland 32, Ohio.

Floyd L. Paschke (right), Sales Manager, Rotor Tool Company, demonstrating use of the Comparator.

Is your grinding productivity up to PAR?

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HIGH POTENTIAL: Lukens Steel's L. P. McAllister and W. E. Mullestein foresee advancing alloy-plate markets.

New Heat-Treat Lines for Plate Bank on Growing Alloy Markets

Steelmakers are investing heavily in continuous heat-treat lines for alloy-steel plate.

They plan to have ready capacity for new market demands.

By **G. J. McManus**
Pittsburgh Editor

■ Steel mills may set new guide posts for product development this year as they move into high gear with heat-treated plates.

In this whole effort, steelmakers are leading and creating a market rather than reacting to it. They now have the production capacity to test the soundness of this program. New facilities will also widen the range of heat treating.

Major Investment—The mills have invested more than $30 million in continuous heat-treating facilities. This is not an overpowering sum by carbon steel standards. For alloy men, however, it has involved some serious plunging.

Their program deals with a relatively narrow area; it does not include bars which take the biggest tonnage of alloy steel. Nor does it take in carbon and low-alloy structural steels.

Instead, it centers on full-alloy constructional plates, quenched and tempered at the mill to yield strengths of about 100,000 psi.

No Sitting Back — Since 1957, heat treating has tripled while shipments have moved sideways. Nevertheless, the heat-treating program has been marked by unique initiative and urgency.

"In the past, the mills would sit back and wait for demand to grow and then put in facilities," says W. D. MacDonnell, president of Great Lakes Steel Corp.

This time, says Mr. MacDonnell, steelmakers built facilities first and then set out to create markets. He points out, in this connection, that Great Lakes has reserve capacity ready for future growth.

A Lukens Steel spokesman backs this general thinking. He feels current heat-treating capacity is in line with market potential. But he admits it represents a reversal of the normal order. Decision on new facilities has normally been made after demand was assured.

Provide Incentive—Recent experience with other products may have influenced mills in the timing of alloy-plate programs. An aluminum man points out the can market might not have looked so inviting if steel mills had come out with thin tinplate two years ago. Aluminum trim made gains in the period just before bright-annealing equipment was provided for stainless.

Are the alloy men being a little

TV MONITORS PLATE: Operator closely monitors heat treating of alloy plate in new continuous line.

hasty with this expansion? They don't think so.

The concept of high strength structural steel "has come of age," says F. T. Brumbaugh, manager alloy products, U. S. Steel. "Growth is due to recognition of different basic design concepts by the engineering fraternity to keep up with strides in other directions."

Many New Jobs — Mr. Brumbaugh says many design engineers and major engineering companies have accepted this notion. He cites countless new applications of high-strength steels. A few years ago, the largest stripping shovel had a capacity of 35 cu yd. Switching from carbon steel to a high yield-strength alloy has tripled shovel capacity.

In bridges, pressure vessels and equipment, the higher yield strength steels are being used to reduce weight or increase capacity. Producers feel the gains fully justify expansion.

Price Is Factor—Behind the confidence of alloy men are some strong economics. Heat-treated alloys sell for about two and one-half times the price of carbon steel. They have roughly three times the yield strength of carbon steel. If full use can be made of its properties, an alloy can offer strength at the lowest unit cost.

The strength-price ratio of structural steels is no accident. At the start of its T-1 development, U. S. Steel set out with a definite target.

Steelmakers Hike Capacity

These facilities for continuous heat treating of plates have recently been added.

United States

United States Steel Corp.—Homestead	2—160 in. line 1—100 in. line
National Steel Corp.—Great Lakes Steel Corp.	1—72 in. line (modernized) 1—72 in. line (quenching equipment added)
Armco Steel Corp., Sheffield Div.*	1—160 in. line
Lukens Steel Co.	1—172 in. line 1—130 in. line
Jones & Laughlin Steel Corp.	1—72 in. line (modernized)

England

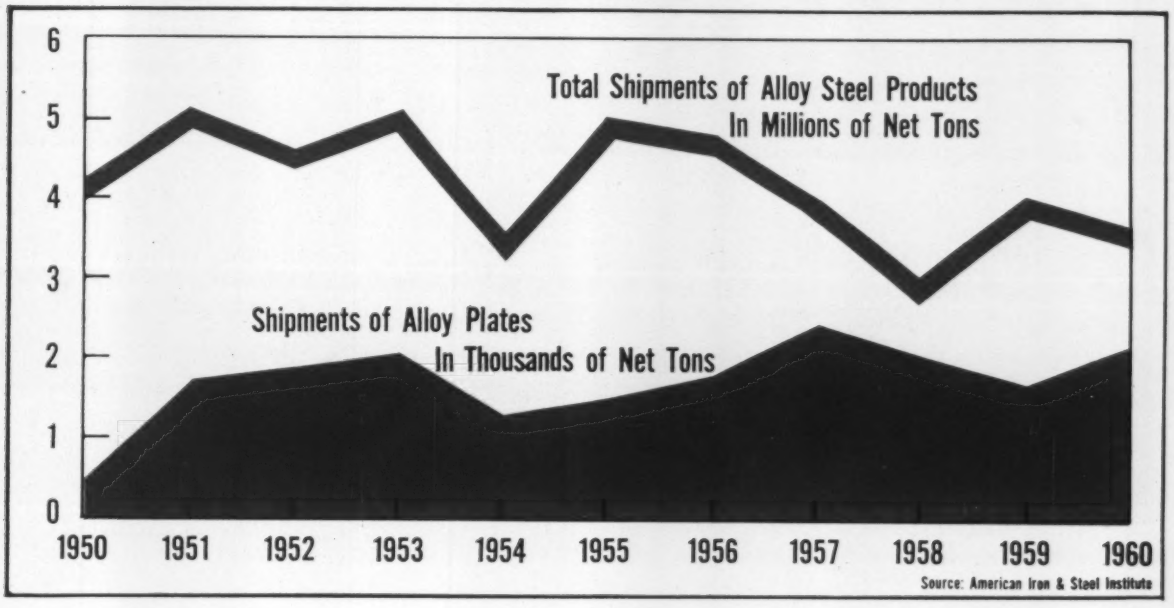
Consett Iron Co., Ltd. (England)	1—134 in. line

Japan

Kawasaki Steel Corp.	1—160 in. line
Fuji Iron & Steel Co., Ltd.	1—142 in. line
Yawata Iron & Steel Co., Ltd.	1—142 in. line
Nippon Kokan Kabushiki Kaisha	1—126 in. line

*Now being completed; line for bars recently added.

Plate Shipments Reverse Downward Trend



Development involved trimming alloy elements to the essentials that would meet price restrictions and still do the job.

This approach helps explain the dramatic savings being offered by heat-treated steels. It also helps explain why the mills have moved so decisively to modern production facilities.

"If they wish to stay in the business, or to get in the business, they need continuous-treating lines," says M. R. Okle, who heads up sales for Drever Co., Bethayres, Pa.

Speeds Production — Mr. Okle says continuous units are needed to meet both the cost and the quality standards of the alloy program. A modern line, he explains, can turn out upwards of 18 tons an hour with a three-man crew.

In any case, the mills have committed themselves to a program of continuous heat treating. There is no sign that anyone is backing off from this program. One mill is talking of a new wide-plate mill with comparable heat treating facilities. New alloy refinements are being cooked up by all producers.

"It's a continuous specifications battle," says an alloy man. "One mill will come up with a composition that shades the price and strength a little. Someone else will go a little further. This is good."

Applies to Many—Moreover, the basic thinking behind heat treating is being applied across the product line.

In the alloy field, there is work on new processing techniques for heavy products as well as for thin gages. One continuous heat-treating line for bars was recently installed by Armco at Houston. There is wide interest in this kind of equipment for other plants. Mechanical tubing is now being supplied in heat-treated form and is attracting strong interest.

Stainless mills are installing at least six new bright-annealing lines. Lee Wilson Co. is supplying thirteen open-coil annealers to domestic producers. Twelve others are going abroad.

In the new, thin tinplate, extra cold working gives added strength and is a factor in the use of lighter gages at less cost. Continuous annealing is also contributing to the trend to stronger, lighter, tinplate.

Sweeping the Country — In all these areas, new processing techniques are being used to get the most out of steel. And the mills are acting with speed. Bright annealing and open coil annealing have literally swept across the country.

However, many of the new crash programs are a reaction to market pressures to some extent. In heat treating of plates, the mills have been ahead of the market.

High - strength materials have made it possible to recapture some applications from aluminum.

However, the high-strength structural alloys were being developed long before aluminum competition had reached present proportions. They were designed primarily as a substitute for carbon steel in applications requiring unusual strength and abrasion resistance.

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QUICK INSPECTION: Following "curing", a workman inspects the mold's bottom section or drag half.

CORE ASSEMBLY: Two men assemble core sections. Then the completed assembly is placed in the mold.

Good Planning Precludes Snags In Casting Huge Impellers

Advanced planning and fixed methods are the key to trouble-free casting of 10,000-lb impellers for high-lift pumps.

Four impeller blades extend above each 60-in. diam casting. Annular risers insure solidity in heavy plate sections.

■ A difficult and unusual casting job took place recently at Bethlehem Steel Co.'s San Francisco shipyard foundry. This job centered on the casting of four, 10,000-lb high-tin manganese-bronze impellers. These impellers serve a quartet of high-lift vertical-diversion pumps.

The 60-in. diam, 45-in. high castings are the largest impellers of this type ever cast. Advance planning and careful adherence to fixed methods insured snag-free casting and core-assembly operations.

From the Bottom—Here's how each casting was made. First, to maintain solidity, it was decided to use an annular riser, or shrinkage head, over the heavy plate section. Four impeller vanes are attached to this plate.

The plate section is bottom gated. This allows the metal to rise from the lowest point and fill the mold cavity, as pouring takes place.

A carbon-dioxide molding process shapes the cores. This same process forms the mold itself. The molding media—in this case sand — contains, among other ingredients, water glass.

Commercial carbon-dioxide gas is added to the mold surface. As the gas passes through the sand, a reaction takes place. Sodium carbonate forms.

This reaction yields a firm, hard mold surface that resists erosion by the metal during pouring. It also insures smooth-surfaced castings.

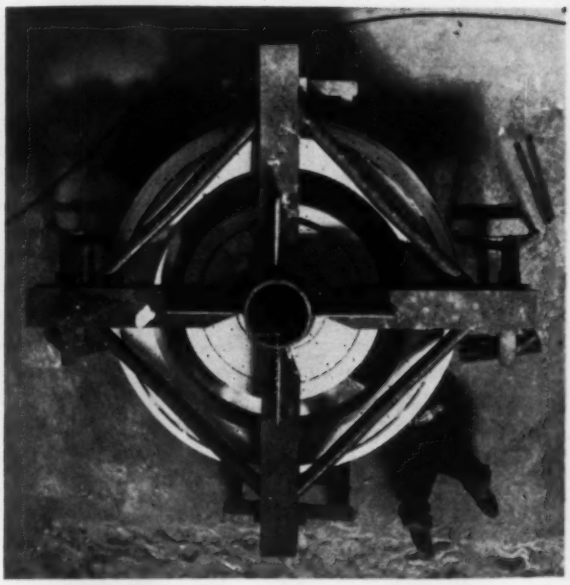
Special Rigging — The drag, or bottom half of the mold, is formed in a flask. All four vanes are molded individually in a core box that generates the impeller-blade curves.

The cope is formed from two covering cores that, because of the annular head, require special rigging. This rigging is known to the foundry trade as an arbor. It locks all parts in their proper positions.

To prepare for casting, all vane cores are assembled on a lifting plate outside the mold. This assembly, locked together, enters the drag. Covering cores are then placed on the drag.

After checking positioning accuracy, the two units are locked together. Then, molten metal at 1850°F flows through the gating system. The complete pour for each impeller takes only four minutes.

TOP OF MOLD: Full-ring riser and arbor form the mold's cope. This cope goes over the core assembly.



KEEP IT SMOOTH: Lying on his back on the foundry floor, a workman smooths the riser's undersurface.

END RESULT: Foundryman on right inspects one of the helical ribs on a newly-cast impeller. Worker at left grinds off all the excess metal that remains on the impeller's ribs after pouring operation is completed.

Force-Fit Problems Fade Away With New Unground Bearings

If you force most bearings on shafts, you open the door to misalignment and unbalance.

A new line of unground bearings solves these headaches.

By **W. N. Redstreake,**
Associate Editor

▪ When unground bearings are mentioned, many people think of rough parts for crude applications. These people should check out a new line of unground ball bearings that boast 15 microinch finishes.

These bearings, made by the Lundquist Tool and Mfg. Co., Inc., Worcester, operate at speeds in excess of 2000 rpm. In fact, the bearing maker is now testing these low-cost bearings for idler use at 5400 rpm. The bearings in this idler will carry light loads.

At slower speeds, the new bearings handle heavier loads. A standard unground bearing with 2-in. OD is rated at 300 lb at 500 rpm. At 1600 rpm, this bearing can carry a radial load of 150 lb. Operating at 2000 rpm, the same unground bearing boasts a radial-load rating of 135 lb.

Design Factors — Each bearing features a two-piece, hardened outer race. An unhardened steel jacket holds the outer race together. When you press these bearings into a nest or housing, the jackets absorb 0.003-0.004 in. compression, without injury to the bearings.

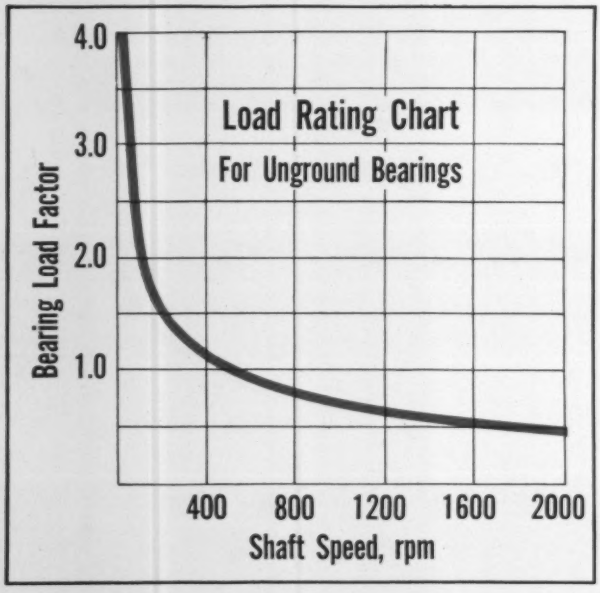
A locking compound secures the loose, slip-fit bearings on their shafts. Shaft surfaces need not be ground. Bore tolerance between each shaft and bearing ranges from +0.004 to —0.000 in.

Every slip-fit bearing is bonded to its shaft with Loctite sealant, a product of the American Sealants Co., Hartford.

In developing the new unground bearings, Lunquist's engineers faced two major problems. They had to design precision bearings with high load capacities. And they had to insure adaptable fits between the unground bearings and both ground and unground shafts.

Eliminate Distortion—Most ball-bearing makers will not guarantee bearings if they're pressed on shafts. A force fit causes rotation on an untrue axis. This creates severe vibrations. It also reduces machinery life and causes lots of downtime.

High-Speed Bearings Support Heavy Loads



Bearing Size, OD in Inches*	Max. Load Rating, lb at 500 rpm	at 1600 rpm
15/16	63	31.5
1 1/8	105	52.5
1 3/8	155	77.5
1 1/2 (11 balls)	173	86.5
1 1/2 (12 balls)	192	96
1 3/4	285	142.5
2	300	150
2 1/2	450	225

*Special-construction bearings are also available with capacities 40 pct higher.

Since the new bearings slide onto their shafts, distortion and untrue-rotation problems are almost nil.

Until now, the use of unground bearings was restricted to about 1000 rpm. Whenever higher speeds were needed, unground bearings couldn't withstand the pace.

Check Your Needs—A load-rating chart and a short table prove that Lundquist's new Lutco bearings have broken this speed barrier.

The load-rating chart helps to pinpoint exact capacities at various speeds. In the table, normal load ratings appear for standard-sized unground bearings operating at both 500 and 1600 rpm.

To find a radial-load rating for an unground bearing at a given speed, select the required speed at the bottom of the chart. Then follow the line that depicts this speed to where it intersects the curve. This will give you a factor.

Rate Bearing to Job—Multiply the bearing's load rating at 500 rpm (listed in table) by the factor. The result corresponds to the bearing's maximum radial-load rating at the required speed.

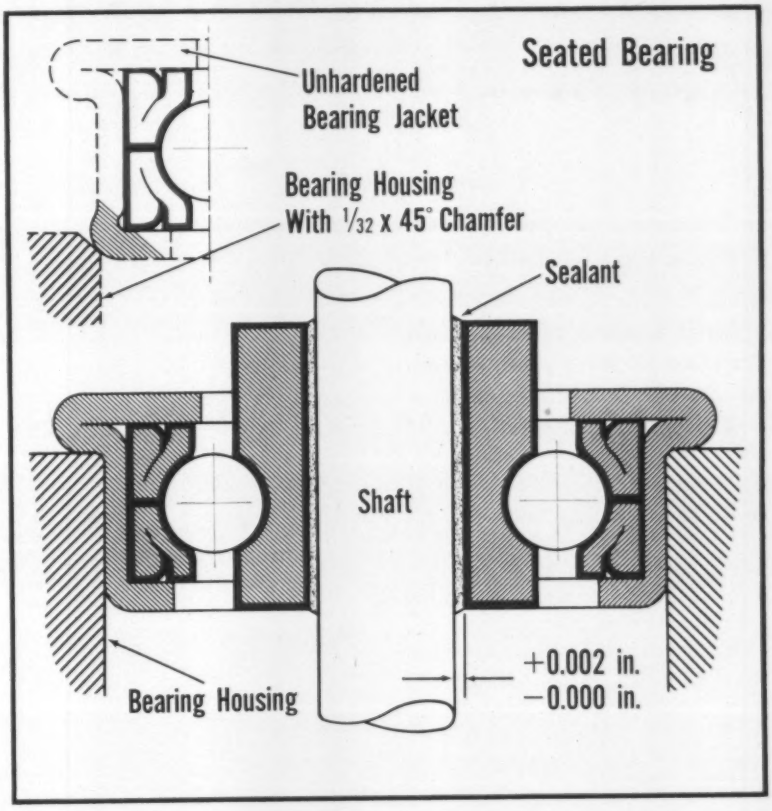
Here's an example. A designer wants to find the radial-load rating of a 1¾ in. OD Lutco unground bearing at 900 rpm. This bearing has 12 balls and is rated at 285 lb at 500 rpm.

The chart yields a factor of about 0.75 for a shaft speed of 900 rpm. Multiplying this factor by 285 lb, the designer obtains 213.75 lb. Thus, the bearing can support almost 215 lb at 900 rpm.

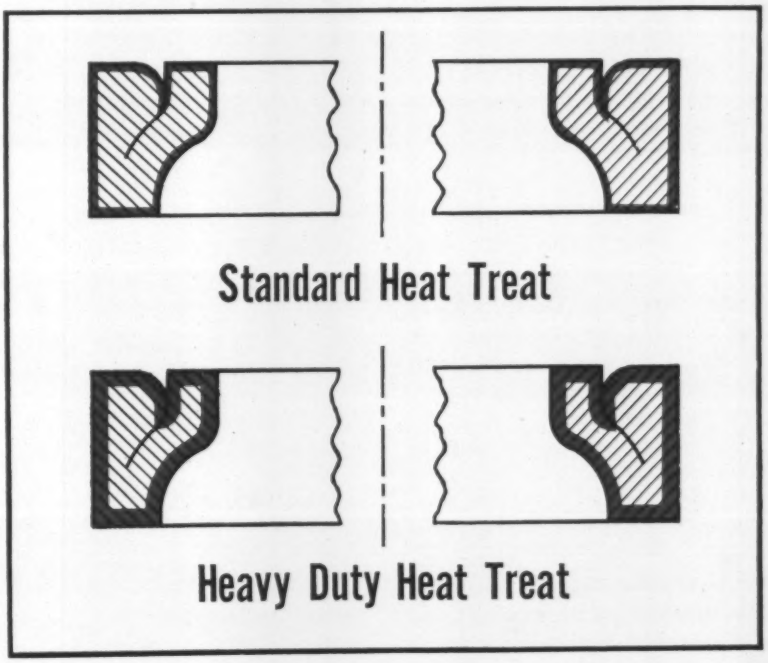
Of course, shock loads of any nature should be anticipated. If shock loads create another design factor, a larger bearing must be selected.

Shape, Then Harden—Why are laminated outer races used in the new bearings? The reason centers on heat treatment. Each half of every laminated race is only 90 pct solid. This allows the shapes to withstand either standard or heavy-duty heat treats with little distortion.

Jacket Compresses in Housing



Shaped Races Don't Distort



Can Copper Alloys Hold the Line At Ultralow Temperatures?

By **C. L. Bulow**—Chief Materials Engineer, Bridgeport Brass Co., Bridgeport, Conn.

Cryogenics applications impose severe burdens on metals.

What happens to copper and its alloys at these sub-zero temperatures? Do their mechanical and electrical properties hold up?

▪ When choosing materials for cryogenic equipment, copper and its alloys deserve close attention.

They have a unique combination of properties at low temperatures. And the needs for large commercial equipment have been largely met. There are new high-strength alloys, new welding and brazing processes, and improved design concepts.

Affects Properties — The tensile strength and hardness of most wrought copper and copper alloys increase with decreasing temperature. A corresponding increase in fatigue strength can also be noted.

Yet, ductility remains more or less constant as the temperature lowers. This absence of brittleness is especially important for pressure vessels. Moreover, bolting, tie rods, and similar products can be stretched considerably before fracture occurs.

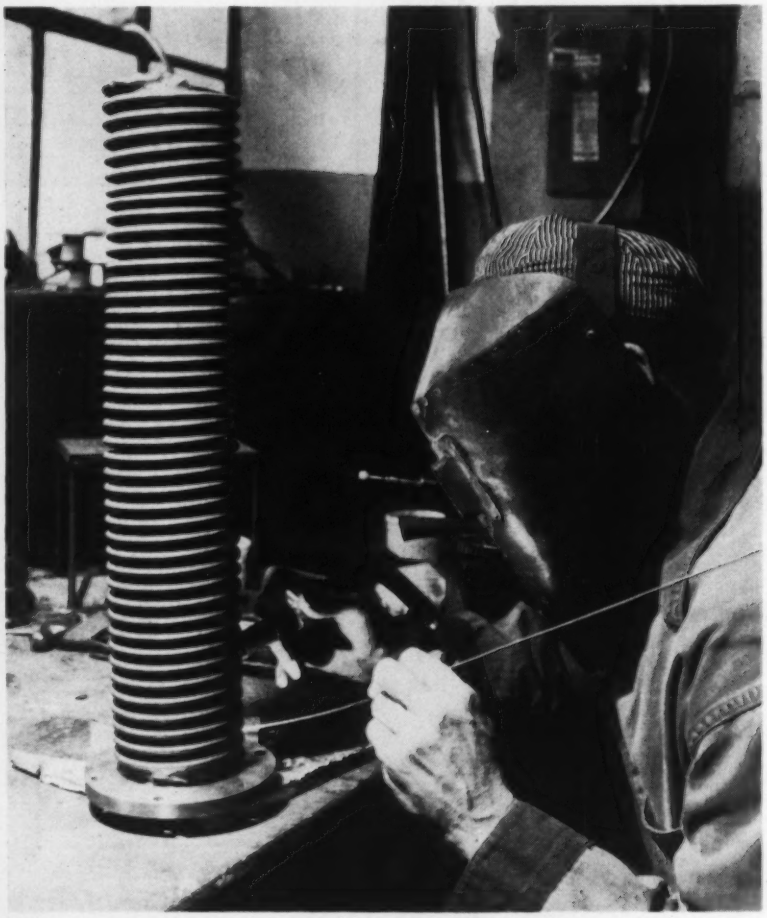
How Are They Used?—Copper and its alloys are used for a large variety of cryogenic applications. Heat exchangers, in particular, depend on these metals.

Tubes, fins, and spacers, made of copper and brass, play important roles in cryogenic heat exchangers. One oxygen-making unit is made by winding a ribbon of a high heat-conducting material, such as copper, on a tube of similar material.

The liquid-hydrogen transfer lines used at the National Bureau of Standards consist of standard copper tubing and fittings. A copper-bellows insert in the outer line allows the inner line to contract while cooling. (A 25-ft long piece of copper tubing shortens one inch when cooled from room temperature to −253°C.)

Bellows Is Improved—Behavior of the bellows in operation points up the improved fatigue properties of copper at low temperatures. For example, one type of bellows which failed after 5000 cycles at room temperature was found to withstand 500,000 cycles at −253°C.

Copper and its alloys are used for handling solvents used in petroleum and chemical processing. They're also used for transporting liquid gases such as oxygen, helium,



CONTRACTS FREELY: Copper bellows, TIG welded to this piping assembly, allows for contraction when liquid gases circulate.

What Happens to Properties at -180°C?

ALLOY	CONDITION	TEMP.	TENSILE STRENGTH, psi	YIELD STRENGTH, psi	ELONGATION, pct in 2 in.	IMPACT STRENGTH, ft-lb
Aluminum Bronze	Annealed Rod	Room	77,300	26,700*	26	I 24
		180° C	96,100	29,200*	29	I 20
Beryllium Copper (2.56 pct Be)	Rod, water quenched from 800° C	Room	76,200	24,900*	36	I 41
		180° C	112,000	50,000*	41	I 40
70-30 Brass	Annealed Rod	Room	51,000	28,200*	49	I 86
		180° C	73,500	29,600	75	I 78
60-40 Brass (Muntz Metal)	Annealed Rod	Room	57,600	—	51	N 8.6
		183° C	75,800	—	55	N 8.3
	Cold Worked Rod	Room	79,700	—	20	N 5.1
		183° C	98,400	—	24	N 5.3
Naval Brass	Rolled Rod	Room	57,200	—	47	—
		183°	81,100	—	48	—
Copper (99.985 pct Cu)	Annealed Rod	Room	31,400	8,600*	48	I 43
		180° C	50,800	11,500*	58	I 50
OFHC Copper	Hard Drawn Rod	Room	52,500	49,000**	20	—
		196° C	69,000	60,000**	35	—
Copper-Nickel-Aluminum	Water quenched from 900° C	Room	51,500	11,400*	42	I 59
		180° C	67,200	22,800*	49	I 67
80-20 Cupro Nickel	Annealed Rod	Room	51,500	27,000*	26	I 77
		180° C	73,700	32,500*	36	I 85
55-45 Cupro Nickel (Constantan)	Annealed Rod	Room	60,000	19,600*	40	I 81
		180° C	89,600	26,300*	57	I 86
Nickel Silver	Annealed Rod	Room	65,000	29,400***	47	—
		183° C	83,100	38,200***	57	—
Nickel-Silver	Cold-Rolled Rod	Room	74,000	69,200***	22	—
		183° C	93,700	80,500***	36	—
Phosphor Bronze A	Annealed Rod	Room	61,600	—	36	—
		183° C	93,200	—	56	—

*—0.1 pct permanent set. **—0.2 pct offset. ***—Yield point. I—Izod test. N—Noted impact value m-kg/cm²

nitrogen, and Freon 12.

These vessels are often made of multiple-wall construction. Copper or silver-plated copper, because of its low emissivity, makes up the outer surface of the innermost surface.

Will It Burst? — The behavior of bursting discs of copper and other materials have been evaluated from −80° to +400°C. Copper showed, as expected, a steady rise in burst pressure with decrease in temperature.

The low resistivity of copper at or below −253°C has been used to advantage in the liquid-hydrogen-cooled electromagnet. Such a magnet requires less than 1/100th the amount of electric power needed to operate a similar magnet at room temperature. And it uses simpler controls.

Electrical switches and wiring for use at sub-zero temperatures are also made of brass, bronze, and copper.

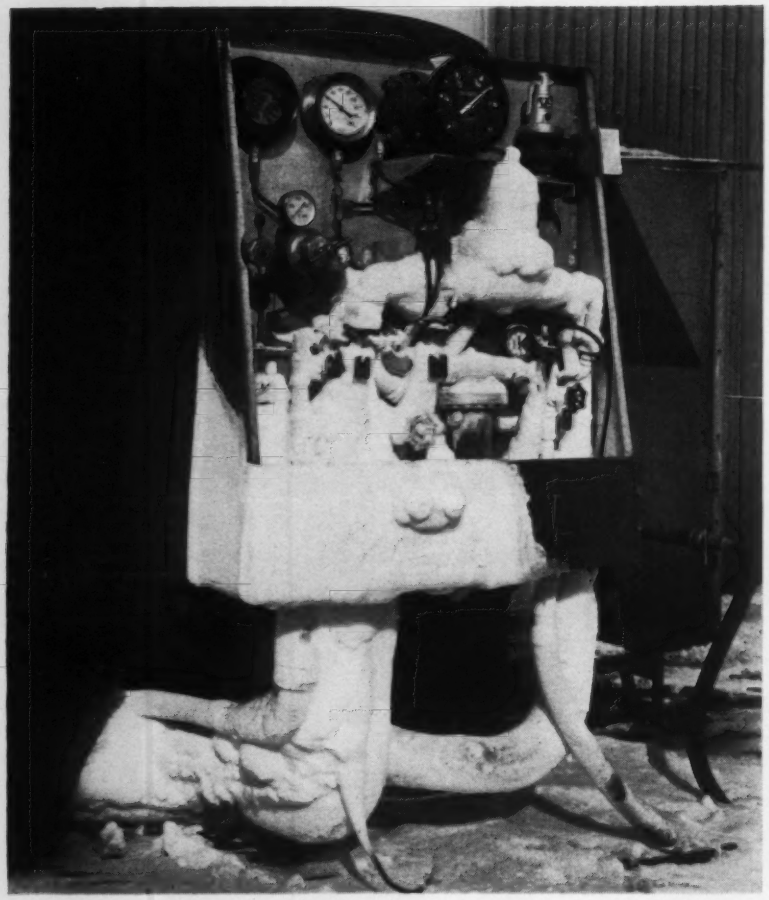
Zero Resistivity—A new design of switch called a cryotron consists of a short piece of wire of a superconducting type of copper-alloy wire around which is wound a copper control wire. Immersing the assembly in liquid helium (below −269°C) converts the internal wire to a superconductor. There's zero resistivity.

Sending a current through the outer control coil sets up, around the inner wire, a magnetic field strong enough to destroy the superconductivity. This return of resistivity cuts off the current flowing into the wire.

Some progress on a magnetic refrigerator for producing ultralow temperatures has been reported. At this stage, it can maintain 0.25° Kelvin.

The present design consists of a nickel-silver case protected by a resin coating. A central cluster of silver-plated copper fins collects the heat. The coil connects to pure lead strips which can be magnetically switched from conducting to non-conducting.

Can Be Soldered—Are any special fabricating techniques required? Copper tubing and fittings are some-



CONVERTS GAS TO LIQUID: Tubing and control manifolding of cold converter are made of copper. Capacity of unit is 90,000 cu ft of gas.

Check Performance Scorecard

PROPERTY	EFFECT OF DECREASING TEMPERATURE
Tensile Strength	Increases greatly
Yield Strength	Gains slightly
Elongation	Improves slightly
Reduction of Area	Decreases or increases slightly
Hardness	Increases markedly
Impact Strength	Decreases or increases slightly
Fatigue Strength	Improves
Modulus of Elasticity	Goes up
Specific Heat	Decreases
Thermal Conductivity	Decreases after slight increase
Resistivity	Decreases slightly

times joined by soft soldering. Solder choice, of course, should be made on the basis of operating temperature. Generally, an overlay is used in these joints to give desired strength at operating temperatures.

What solders are used? Of major interest are tin and tin-lead solders. Most tin-lead alloys containing 0-5 pct lead don't become brittle until about −110°C.

As lead content increases, the ductile-to-brittle transition temperature becomes increasingly lower. A 50-50 tin-lead commercial solder becomes brittle at −150°C. (Its ultimate strength, though, increases to 18,500 psi.) And alloys containing up to 70-80 pct lead remain ductile down to −273°C.

Brazing is Preferred—When better leak tightness is desired, copper alloy joints are usually brazed rather than soft soldered.

Even with low melting-point alloys, the brazing temperature is high enough to soften the work-hardened material. Thus, many of the brazed and welded joints end up in the annealed state.

The low thermal conductivity of silicon bronzes and other alloys localizes the effect of heating close to the joint. However, using copper heat sinks during brazing helps retain a greater part of the higher strengths developed by prior work hardening.

Choose Alloy Accordingly—When softening cannot be prevented, alloy choice should be based on the mechanical properties of the annealed alloy.

Softening due to welding can be minimized. Special techniques such as pressure contact and spot welding are used. Another way is to increase the gage of the metal in the heat-affected zone.

It is anticipated that in some apparatus, the newer heat-treatable copper alloys may find application since the strength of the welded joint could be increased by heat treating after welding.

Rotating Unit Welds Pipeline

Until now, pipeline welding has presented many problems.

Using a new welder, a three-man crew joins large-diameter pipes without rotating them.

■ A new process automates pipeline welding in the field. The key to this process centers on a new welding unit. This newcomer welds pipe joints twenty times faster than hand-welding methods.

The welder clamps over two pipes and joins them—without rotating the pipe lengths. Welding is completed with two motions of a cutter and two of the arc welder.

Less Handling — This promises long-awaited pipe-handling changes in the field. At present, it takes a team of 20 men to weld a pipeline. These men must be strung out a mile or more. With the new process, only three men make up a full welding crew. These men include a welding technician, his assistant and a caterpillar-tractor driver.

Pipelines serve as the prime means of moving petroleum overland. This year, more than 27,000 miles of pipe will be laid throughout the world. A weld will join this pipe about every 50 ft. Thus, almost 3,000,000 field welds will be needed in the next 12 months.

The new process, developed by the Esso Research and Engineering Co., is the result of several years of research. Cooperating in this research were the Battelle Memorial Institute and the Air Reduction Sales Co.

Simple Setup — A prototype welder, which has undergone a six-month field test, joins 4-, 6- and 8-in. diam pipes. However, the entire process can be adapted for use on 30-in. diam and larger piping.

Here are the basic steps in the new process. Steel pipe is spread along the ditch in which it's to be buried. The caterpillar lifts the pipe and places the automatic welder over the pipe ends.

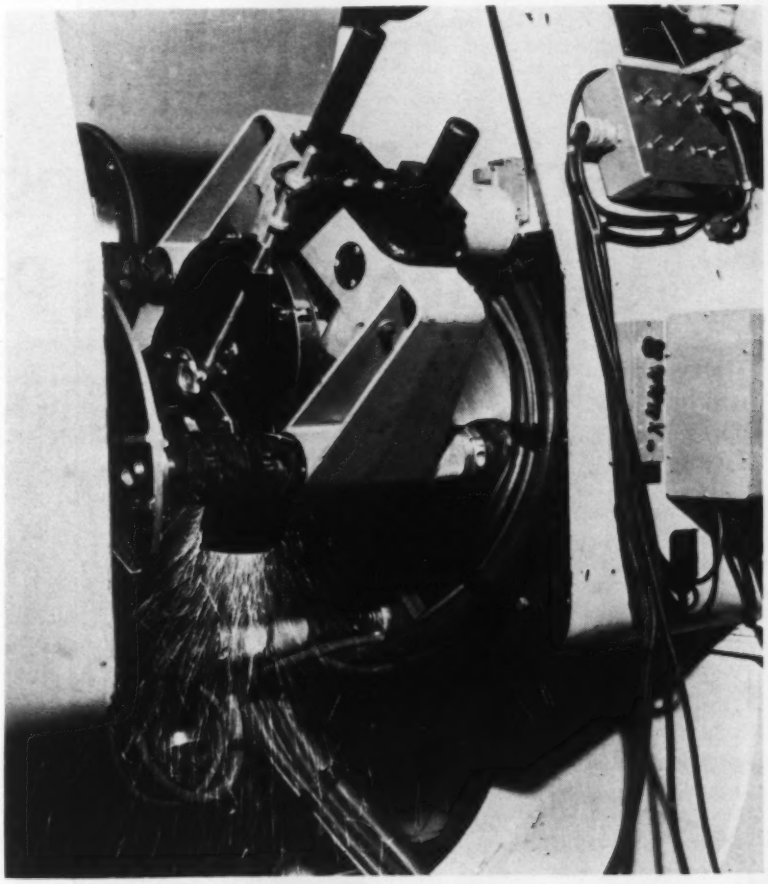
An internal-alignment clamp, inserted in each pipe, holds the ends firmly together. After the welding, the clamp is collapsed and withdrawn to the next joint.

Slices Pipe—When the welder is positioned over the pipe ends, it clamps both ends in place with its dual prongs. Then an air-driven abrasive wheel slices a small sliver from each pipe end. It does this in two circular sweeps.

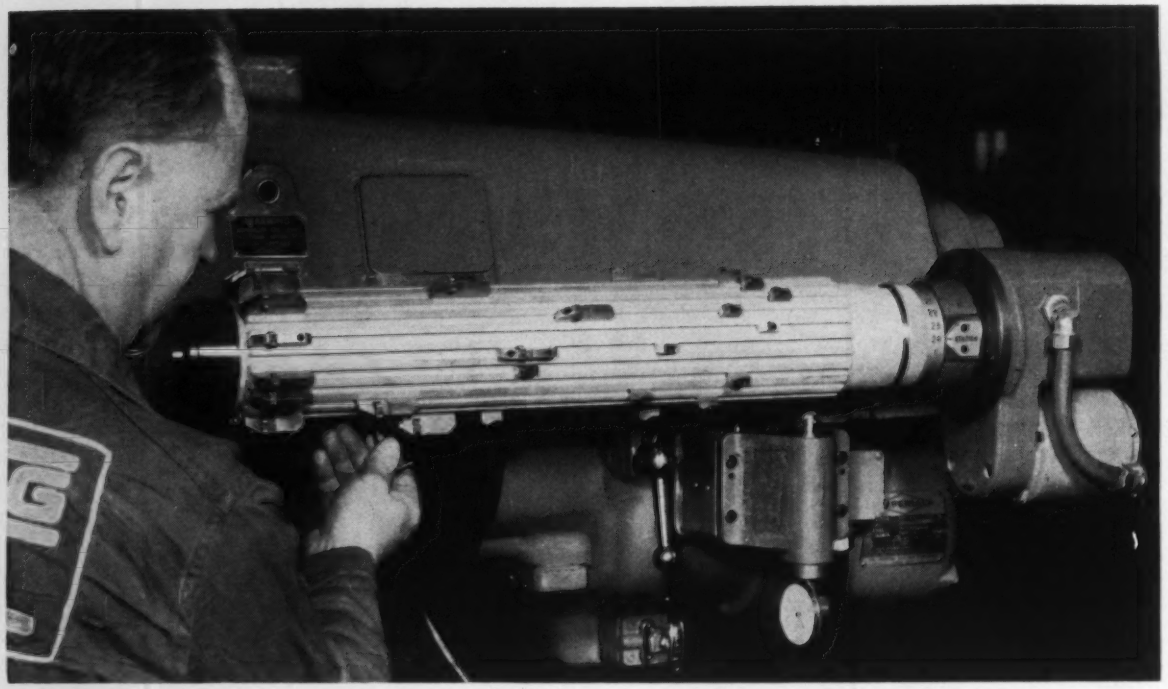
The arc welder follows the cutter's track and performs the weld. On 8-in. pipe, welding takes only one minute. Yet, the weld is just as strong as manual welds that require up to 20 minutes. After the cutter prepares the pipe, no other treatment is needed.

M. J. Dabney, head of Esso Research's pipeline program, says that the major problem solved in perfecting the new process was how to weld without rotating the pipes.

Mr. Dabney views the process as having possibilities in other fields. "Ship builders and storage-tank manufacturers may find it adaptable to their specific needs," he says.



SWINGING WELDER: Lab test shows automatic welder, clamped over pipe ends. This arc welder joins the pipes as it swings around them. A three-man field crew can weld two 8-in. diam pipes in one minute.



IMPROVED CONTROL: Newly-designed control dogs improve machining operation of horizontal jig borer.

Materials Engineering Raises Machine Tool Performance

Full use of advances in newer materials can give you both improved design and lower unit costs of production.

So when the time comes for redesign, be prepared.

By **R. H. Eshelman**
Machinery Editor

■ If you've ever designed a new product component, then you know how important it is to be alert to changing technology. Here's a case where some of those new ideas were put to work. It resulted in an improvement in part function plus a worthwhile reduction in cost.

Savings stemming from advances in metalworking can be missed unless you're alert to their potential significance for your product. Sometimes it takes much development effort to cash in on such rewards. It also involves old-fashioned persistence and ingenuity. The trick is never to lose sight of the basic function of the product part.

Engineers at DeVlieg Machine Tool Co., Detroit, met this problem "head on" in a redesign program. They recently improved a major control element for their varied line of jig borers using new methods and materials to cut costs.

The company has achieved depth control with a unique combination of dial and memory sleeve elements.

Period of Change—According to R. A. Jerue, Vice President, Engi-

SINGLE MATERIAL: Extruded aluminum helped R. A. Jerue, DeVlieg's Vice President, Engineering, cope with two problems.

neering, "Advent of tape control, and an advanced dial-in system for mechanized control, meant that this function became more important than before. Tape forced a more sophisticated version.

"And the former unit was definitely inadequate for what we wanted it to do. It was necessary to at least double up on the old routine by adding slots. Then the dogs themselves in the new design turned out to be more sophisticated, too."

Also required for tape controls was a double set of dogs. One set controls depth of penetration of the machine spindle in its final cut. The other acts as an auxiliary dog to take care of the rapid traverse approach. Both functions are now handled automatically.

Quick Changeover — There was one feature that engineers wanted to build right into the redesigned system. They felt they could drop the cost of the control sleeves down to the point where a user would be able to leave the dogs set up on the machine.

As such, the operator would just switch drums rather than reset them for each job. This would be a big advantage, especially on complex jobs.

The former setup precluded such design because the sleeves were too costly. They were machined from steel tubing stock. Dovetail slots were milled, then ground. So much precision was required that the entire process of manufacture was very costly.

The company decided to keep the present memory sleeve for depth control. This setup makes programming easier. It also eliminates the problem of maintaining tool length.

Aluminum Extrusion—The answer to the dual problem of lower cost and added slots seemed to rest in a light metal extrusion. Cross section of the sleeve part was such that the company decided to look into special stock material that was already preformed.

Why not try aluminum? The cross section itself had no measuring function. Accuracy was vital in function only: the final dog settings. It was not, however, important in the dimensions of the sleeve. Also, extruded aluminum would provide enough strength in the overall lengths of 27-30 in.

Designers prepared two sets of drawings: the extruded sleeve and the dimensions of the mating dogs. Engineers assumed that both of these parts could be made from extruded stock. Of course, they would have to be cut off to proper length and modified by machining.

Start All Over — The master mechanic and tool engineers then sat down with the materials supplier. They arrived at an impasse. Why? First of all, the required dimensions for the mating of the two pieces made the problem too tricky. Both parts would need wear properties, too. That meant plating or coating would be involved.

The solution would have to be through some other approach. DeVlieg's design engineers went back to the simpler extrusion: the trip dogs. The supplier developed a die design for them. Final proof pieces of the dog extrusion appeared to be adequate.

Then the machine designers measured the cross section of this extrusion and changed their drawings accordingly. Meanwhile, the extrusion plant went to work on the dies for the sleeve cross section. They would allow for a sliding fit with the dogs.

Better Approach—It was agreed that some variations in this piece could be allowed in twist, sag and other dimensions over the extruded length. They would have little effect over the short length of the finished sleeve. Coating or plating of the sleeve could be avoided, too.

The surface finish of the extruded aluminum proved well adapted to its function. Only one surface of the dogs is now treated. It's done by a special chrome-plating process.

This particular work surface happens to be the point of contact where the wedge locks the dog into position. Here, the wedge fits in the grooves along the bottom of the dog. A set screw tightens the wedge, an action that spreads both grooves along their entire lengths. This

New Approach Saves Steps

COMPARISON—Machining Operations Turret Feed Sleeve

(Part size: 3 1/8 in. OD by 5/8 in. wall, lengths vary)

Previous stock—steel tubing

1. Cutoff
2. Stress relieve
3. Turn OD and centers; grind
4. Grind OD
5. Mill 0.4375 in. slot
6. Re-center
7. Mill other slots required
8. Break sharp corners
9. Finish grind
10. Stone sharp corners
11. Inspect
12. Flash chrome
13. Inspect

Total Operations = 13 Time = approx. 12-14 hr process

Present stock—aluminum extrusion

1. Cutoff
2. Rough and finish turn, chamfer, face and center, mill 0.4375-in. slot, (one setup.)
3. Burr
4. Vapor blast
5. Inspect

Total Operations = 5 Time = approx. 2½ hr process

gives a wide bearing surface and bars any problems in function.

Little Effort — The machine builder now gets the two extrusions in long lengths. The shop merely saws the sleeve extrusion to length, then machines the ends.

After the sleeve is machined, it's just a matter of spacing brackets at proper distances. Then you have the basic device for any unit in the machine line. DeVlieg uses one of its own Jigmils to handle the whole operation in a single setup. When parts were made on a lathe from steel tubing, concentricity had been a problem.

Now the operator drops the cut-off stock in a nest on the jig borer and works both ends. Turning is done in the boring operation. Where turning used to take 4-5 hours, it's now just a 13-minute job.

New Tool — Tool engineers at the plant designed a combination Microbore tool that does the turning, facing and centering. First, the unit hogs out one end. Then the operator turns the part around to hog out the other end. Thus, the required turned portion at the end is produced.

The unit faces, centers and then, while the part is still on the same setup, the operator hand mills in a timing slot on one end.

Processing the dogs is much easier now, too. Three types of dogs are required. All of them receive the same chrome-plate finish.

The operator first cuts the stock to length. The finished profile is obtained by a milling pass in one direction. A drilling step completes the part.

Heavy Buying — To hold down material costs, the extrusions are ordered in large lots. For instance, the stock is also supplied to the English licensee of the company. This aids the mill-run situation.

Besides, there are only a few presses in this country capable of supplying the sleeve extrusion.

Here's another design bonus. In the numerical control machine, the control turret is motor driven. The aluminum design is more adaptable to this function. Reason is its light weight. Hence, there's less inertia when rotated. A heavier part would tend to overrun. It would also require more power and control.

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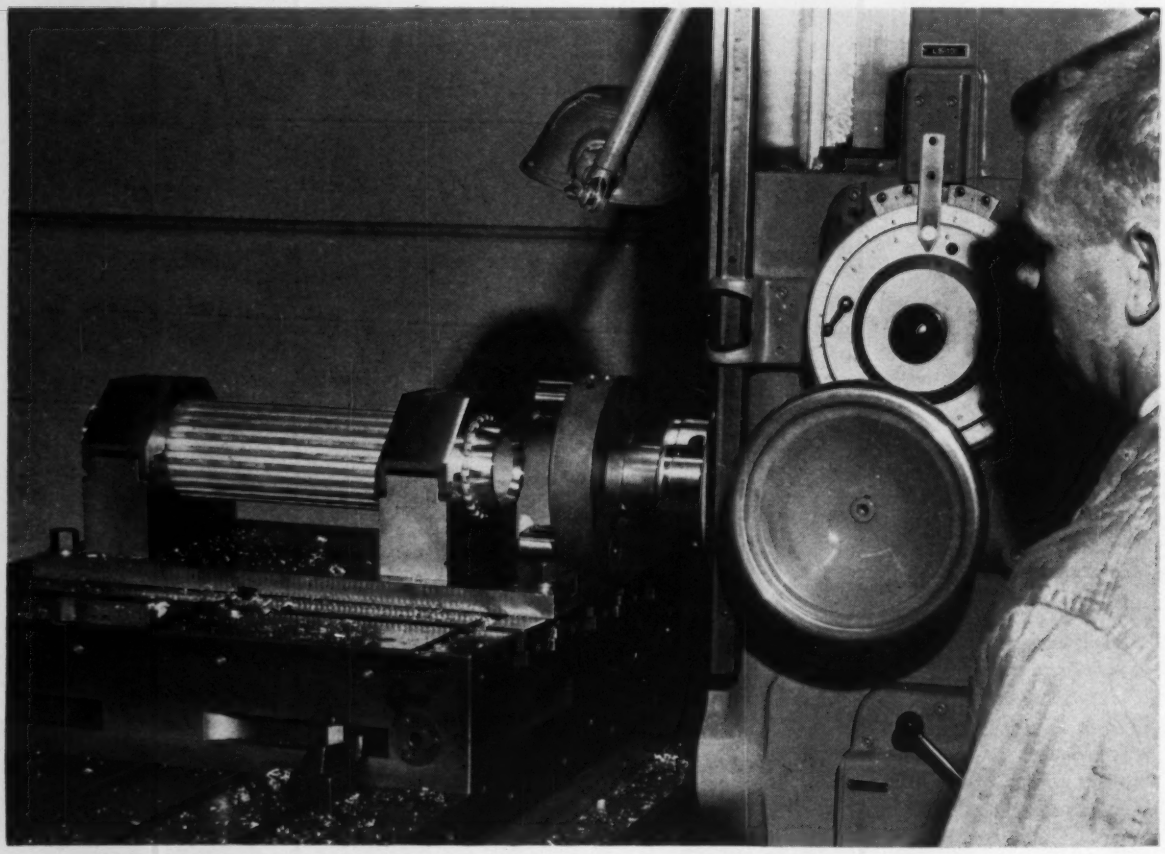

SPECIAL TOOLING: Nest-type fixture holds extruded sleeve on the special boring machine where both ends are milled, inside and out. Fixture swings around to machine opposite end in single setup.

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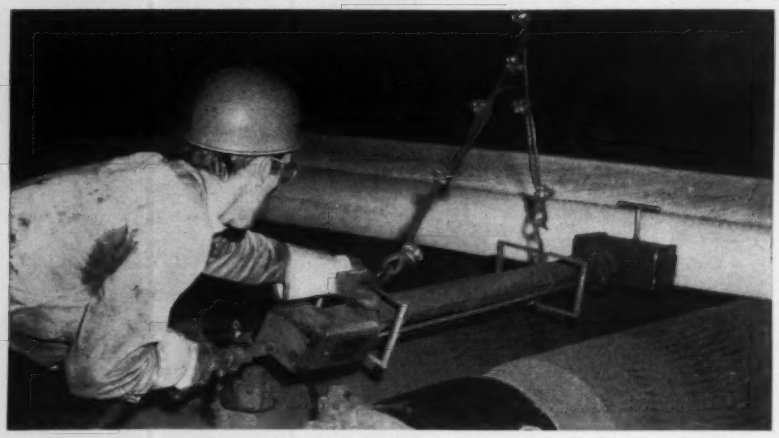


This worker at the Coatesville, Pa. plant of Lukens Steel Company is using a Pannier Marker equipped with the newly-designed magazine-style marking head to stamp hot slabs with an identifying number.

Hot Steel Marking by controlled impact

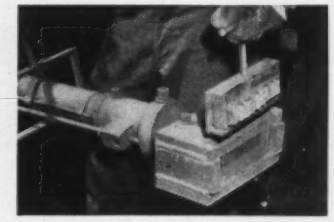
Uniformly clear stamping of heat or ingot numbers on billets or slabs, or serial or part numbers on hot forgings is provided by Pannier Single Stroke Pneumatic Markers.

The operation is positive, fast and automatic. The worker, standing comfortably back from the heat, is able to position the marking head accurately against the steel. The hammer first aligns itself, trips itself and makes the impact automatically.

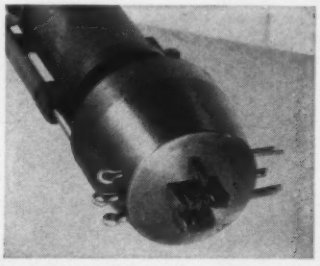
The new head shown here incorporates a fast-change typeholder that permits users to change entire type set-ups quickly, easily and safely. Pre-set type is now economically possible. In just a few seconds, a spare type magazine with an all-new type set-up can be inserted into the marking head. Pre-setting type prevents costly down-time for changes.

The type magazine is made to accommodate lines of interchangeable characters positioned to your specifications. The type is held secure in the magazine by Pannier's sure-safe locks...spilling danger is eliminated.

Pannier engineers will be glad to consult with you on hot steel marking. For complete information, write



This fast-change stamping head shown in operation above uses a type magazine. By the use of spare magazines for type changes, a new set of numbers can be dropped in place in seconds.



Hardened type is easily released for change in this style Pannier marker head by sliding out the pins. This head is effective where numbers are repeated on several pieces.

Pannier markers are now available for automated operation for larger billets and slabs. This numbering head contains a series of number wheels, rotated and set by push button, tape or card control. The entire marking operation can be completed by programmed remote control.

MASTER PANNIER MARKERS

PANNIER MASTER MARKERS
243 Pannier Building, Pittsburgh 12, Pa.

NEW PATENTS

Improves Heat Transfer

Method of heating objects, D. K. Griffiths (assigned to U. S. Steel Corp.), Dec. 27, 1960. A process for heating steel ingots, in either a regenerative or recuperative soaking pit, improves heat transfer. This results from the pit arrangement of placing all the ingots in a prescribed, irregularly-spaced pattern. U. S. 2,966,349.

Ore Crushing

Material crushing and grinding means and method, J. F. Meissner, Nov. 29, 1960. In a method for economical, load-impact crushing of readily-fractured ores, e. g. high-lime iron ores of New York and Canada, you drop the chunks of ore from a substantial height onto a bed of finer pieces of the ore. Large lumps return to the elevation and drop again. No. 2,962,229.

High Temperature Alloy

Alloys for high-temperature service, J. F. Baldwin, Jan. 3, 1961. An alloy has improved hot hardness and resistance to wear, abrasion and oxidation when highly heated. Preferably, it comprises 1-1.3 pct C, 13-20 pct Cr, 9-12 pct W, 7-10 pct Co, and the remainder Fe. The amount of tungsten should be about 2 pct greater than the amount of cobalt. U. S. 2,967,103.

Aluminum Cladding

Aluminum cladding of steel, W. Batz and J. W. Thurman (assigned to Jones & Laughlin Steel Corp.), Dec. 27, 1960. A process clads steel with an aluminum coating of uniform thickness. The coating will adhere to the steel when it is deformed. The clad material is heated to 700-1070°F to effect metallurgical bonding between the steel and the aluminum coating. U. S. 2,965,-963.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Automatic Chucks

A new 32-page illustrated booklet presents interesting application ideas for a line of single spindle chucking automatics. Information on workpieces, tooling, machine functions, setup and methods is carefully presented. This data should be of help to all machine users in getting the most from their equipment, and of interest to anyone contemplating installation of accurate, high production turning machines. (Warner & Swasey Co.)

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Cutting Machines

A new publication, titled "Modern Heavy-Duty Gas-Cutting Machines", is available. This is an eleven-page illustrated article on heavy duty cutting machines. (Messer Cutting Machines, Inc.)

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Pushbutton Stations

An eight-page bulletin discusses a line of pushbutton stations for standard and heavy-duty applications. Publication includes photos of standard pushbutton units and stations, dimensions and ordering information. (General Electric Co.)

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Zinc Manual

The American Zinc Institute, Inc. has released a new and definitive inspection manual governing protective zinc coatings on products hot galvanized after fabrication. The manual should prove an aid to product inspectors, designers, as well as the galvanizing industry itself. The manual helps manufacturers achieve optimum corrosion protection from the galvanized coatings on their products. In comprehensive and concise form, the manual describes significant factors governing inspection, properties, specification, and purchasing, of hot dip zinc coatings.

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Nylon Stock Shapes

Physical properties, typical applications and available standard shapes of nylon formulations are listed in a two page brochure. Various industrial uses of the nylon are illustrated. (Polymer Corp.)

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Connectors

Details of a new series of circular connectors are described in a two-page illustrated bulletin. The connectors are manufactured in accordance with MIL-C-26500 and are designed to meet the stringent environmental requirements of high performance aircraft, missile, space, and marine vehicle applications. (Consolidated Electrodynamics Corp.)

For free copy circle No. 6 on postcard

Optical Comparators

Though it contains complete catalog information, a new book goes a few steps further. For instance, one section takes the reader through a step by step, illustrated demonstration of how basic measuring is accomplished. (Jones & Lamson Machinery Co.)

For free copy circle No. 7 on postcard

Basic Brick

Basic brick products are illustrated in a new 10-page data book-

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **3/9/61**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

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31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
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FREE LITERATURE

let. The bricks are used primarily in the steel industry in open hearth furnaces, but they also have wide application in glass tanks, nonferrous metal furnaces. Also in electric furnaces, soaking pits, forge furnaces, and checkers. (H. K. Porter Co., Inc.)

For free copy circle No. 8 on postcard

Synchronous Motor

Vertical synchronous motors from 250 hp and up are covered in a 2-page data sheet. The motor line is particularly suited for vertical pump drive. They feature durable cage windings for permanent starting characteristics, heavy section, steel plate frame, duty selected bearings anchored field coils and "cool-air" ventilation. (Electric Machinery Mfg. Co.)

For free copy circle No. 9 on postcard

Electronic Information

An 8-page brochure describes a new electronic system of searching metallurgical and related literature for specific information on subjects. It discusses the mechanized way to reduce research costs and increases accuracy, speed and effectiveness. (American Society for Metals)

For free copy circle No. 10 on postcard

Selects Taps

A 5-color, 36-page catalog lists more than 1,200 different sizes and types of standard taps which are all available from stock. Recommendations are made to solve practically any tapping problem, regardless of material, type of hole or class of fit. (The Hanson-Whitney Co.)

For free copy circle No. 11 on postcard

Thermostatic Trap

Some of the advantages in providing non-cycling modulated flow through a thermostatic trap are described in the new two color folder. Continuous modulated flow capacity on ½ in. through 1¼ in. sizes, dimensional and specification data also furnished in easily selected style. (The C. E. Squires Co.)

For free copy circle No. 12 on postcard

Gage Ideas

An idea book picturing many ingenious gage modifications, of interest to inspection engineers, is available on request. The 84-page booklet shows how standard components can be incorporated in special and unusual gaging assemblies. Simple solutions to many common gaging problems are shown. (Boice Gages, Inc.)

For free copy circle No. 13 on postcard

Packaging Foam

A new 12-page technical sheet explains a reusable, expanded-foam plastic used for packaging, cushening and protection of delicate or sensitive equipment. Product features include closed cell construction, abrasion resistance, no odor, and excellent insulation value. (Pac-Tron Inc.)

For free copy circle No. 14 on postcard

Sealed Switch

Rotary linkage-lever actuator for use in locations where actuation and release may ordinarily be impaired by ice and dirt is covered in a two page data sheet. The rotary lever is directly linked to the actuating device to provide positive actuation and release regardless of environmental conditions. (Micro Switch, Div. Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 15 on postcard

Tool Components

A 24-page booklet, was prepared to give the designer and engineer a clearer concept of standardized tool components and their varied applications. Case histories, citing specific examples, cover their use as standard parts for jigs, fixtures, tools and dies. Fully illustrated, the new booklet points up the advantages and the savings effected in design and machine shop time, by the use of these standardized tool components. (P I C Design Corp.)

For free copy circle No. 16 on postcard

Commercial Rivets

Advantages of using special rivets for fast, secure and economical fastening in blind or open applications are described in a new, 12-page booklet. A series of charts, drawings and photographs covers such topics as how to choose the right rivet for the job, recommendations on drill hole size, material thickness and guide and an application tool guide covering three powered and three hand-actuated rivet setting guns. (Cherry Rivet Dev., Townsend Co.)

For free copy circle No. 17 on postcard

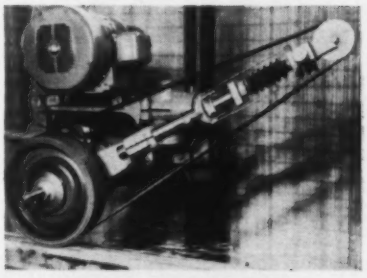
New Materials and Components

Optical Checks End Operator's Measuring Errors

Optical settings made with involute-curve checkers allow angle settings within 0.001° without using gage blocks. This eliminates error due to operator's "touch." Checking accuracy is repetitive within 0.0001 in. The instruments probe the curve profile on spur or helical gears. They will also gage tooth spacing. Special adapters allow checks of internal gears. A direct reading from a graduated scale and a dial indicator shows the error in form. Rapid checking for constant form on successive teeth is possible because checks are made on any point of the contour. If desired, a recorder provides a permanent record. (Michigan Tool Co.)

For more data circle No. 21 on postcard, p. 101

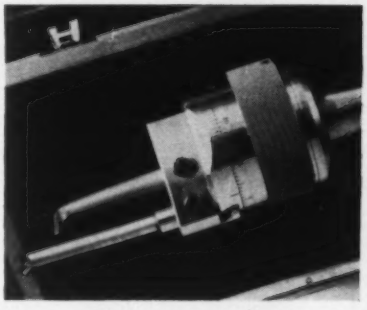
Attachment Converts Lathes for Polishing Jobs



Easily - installed, abrasive - belt arm attachments add polishing capability to existing equipment and increase the scope of production-finishing jobs. They mount on the spindle housings of buffing lathes. Belts are spring loaded between a contact wheel and an idler pulley. A lever allows fast belt changes. The belt tracks through a readily-adjustable mechanism. Various standard arm attachments handle belts 2-8 in. wide and 96- through 132-in. long. They also adapt to other lengths. (Acme Mfg. Co.)

For more data circle No. 22 on postcard, p. 101

Boring Heads Combine Strength and Compactness



Boring heads, in practical sizes for all machines, boast precision and easy adjustment. Small, but adequate size results in little interference in the work area. All parts are high-grade alloy steel with hardened work areas. The vernier adjusts to 0.001 in. Each tool block has several end holes for cutters; one on- and one off-center hole, plus a through cross hole. This speeds the work and increases the boring head's usable range. You don't have to return the tools to the factory for minor adjustments. Easy-access points simplify normal upkeep. (Maxwell Industries, Inc.)

For more data circle No. 23 on postcard, p. 101

Electrode Upgrades Out-of-Position Welds

Where weld-metal quality is critical, a new electrode welds difficult out-of-position work with good results. Responsible for the electrode's improved welding characteristics is a newly-formulated coating. One result of the unusual formulation is a strengthened coating crater. Added crater strength improves arc direction in horizontal and vertical working positions, especially where fit is tight. This makes single and multipass operations easier. The added strength also deepens electrode penetration, even in rough jobs. Therefore, the welds meet high-standard X-ray requirements. Fast-setting slag and good wetting action produce a uniformly flat bead, shown in field tests to be pit-free. In addition, the electrode's vertical-down welds are also pit-free. (A. O. Smith Corp.)

For more data circle No. 24 on postcard, p. 101

WARD
For Countless Uses
of
SPRING
STEEL

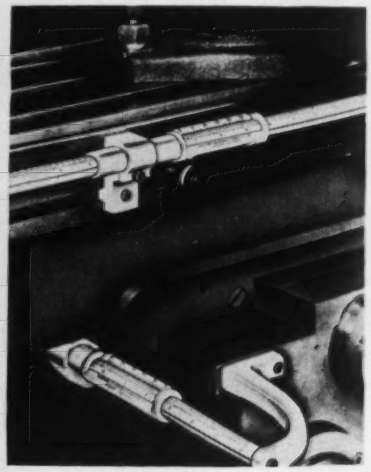
AMERICA'S LEADING SUPPLIER
Where
SERVICE and QUALITY
is the rule

WARD
STEEL
CO.
Boston—Cambridge, Mass.
Chicago, Ill.—Greensboro, N. C.

DESIGN DIGEST

Vernier Scales

Designed to increase efficiency and hold close tolerances on old machines, these vernier attachments

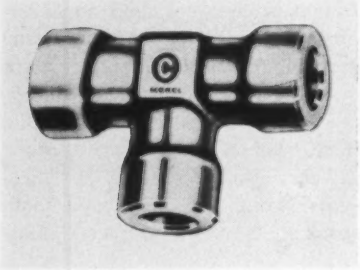


provide ±0.0002-in. accuracy in positioning and relocating points on milling machines, lathes and similar equipment. The unit eliminates measurement of hole centers and other time-consuming, locating jobs. Better productivity should result. It also compensates for machine setting errors. (Edgcomb Engineering & Engraving Co.)

For more data circle No. 25 on postcard, p. 101

Weld Fittings

Leak-proof performance under vibration and shock stress is a feature in a new line of socket-weld

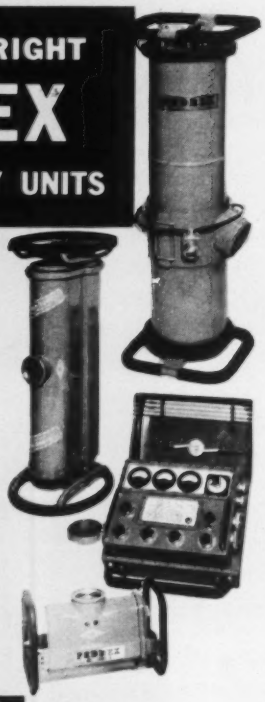


tube fittings. They are available in aluminum, brass, inconel, nickel, steel and stainless steel. In addition to a standard line, the fittings are made in custom shapes, sizes and materials. (Cajon Machine Co.)

For more data circle No. 26 on postcard, p. 101

Lightweight • Compact • Rugged!

CURTISS WRIGHT
FEDREX
PORTABLE X-RAY UNITS



Small, portable, high-powered FEDREX units are the most flexible and useful X-Ray equipment ever offered. Their high ma output, long duty cycle and rugged construction are unequalled. Available in 140, 160, 200 and 260 KV units. (160 and 200 KV 360° models also available.) Stepless independent KV and milliampere adjustments over wide ranges permit exact exposure setting without guesswork. Built-in synchronous timer and exposure charts simplify setups and assure accurate results.

Shielding in the X-Ray head reduces stray radiation from all models to 5mr/hr or less at 10 feet. Automatic shut-off controls provide complete overload and flashover protection.

Write for additional information or phone SWinburne 9-0500

CURTISS WRIGHT
Princeton Division CORPORATION Princeton, New Jersey

Mark 5F Ultrasonic
Flaw Detector

Price for single frequency unit — $1785.00 plus accessories

Portable, ultrasonic testing equipment provides on-the-spot inspection of metals, ceramics and similar materials. Curtiss-Wright's Mark 5F clearly locates cracks or other internal and surface defects with exceptional close-to-the-surface sensitivity. The Mark 5F is designed to provide optimum performance over a broad range of quality improvements and cost reduction applications in laboratories, shops, or in the field.

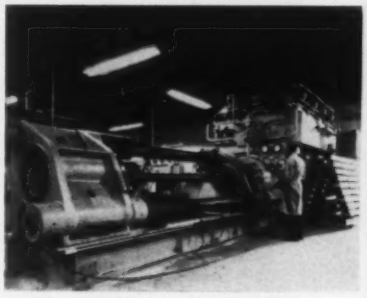
- **Portable** — 5¼" wide x 10⅝" high x 18⅛" deep
- **Lightweight** — weighs only 28 lbs.
- **Exceptional Sensitivity** — detects flaws as small as 1/64" diameter
- **High Resolution** — defects of 3/64" diameter can be detected .030" below the surface.
- **Operating Flexibility** — provides test frequencies from .6 to 5.0 megacycles.
- **Clear Presentation** — high brightness cathode ray tube provides easy viewing, even in full daylight.

Write for additional information or phone SWinburne 9-0500

CURTISS WRIGHT
Princeton Division CORPORATION Princeton, New Jersey

New Equipment and Machinery

Cold-Steel Impact Press Extrudes Missile Motors



Missile motor tubes are now being extruded on a mass production basis. The machine responsible is a new cold-steel impact press capable of producing 14-in. diam. closed-end tubes that are 10-ft long. They don't need welding or finish machining. The press holds wall tolerances to 0.005 in. It can also extrude tubes with walls of varying thickness. This allows tube designs with vanes, ribs, flutes and other projections as integral parts. It eliminates secondary processes and increases strength. This press should help meet the growing need for precision tubes. (Mathews Corp.)

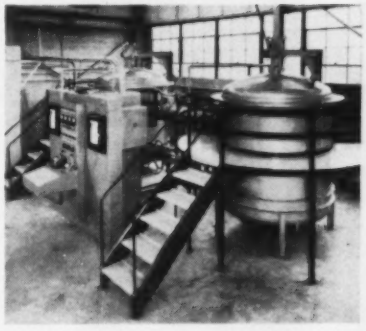
For more data circle No. 31 on postcard, p. 101

Turret Drill Carries Its Own Tool Crib

Almost a drilling department by itself, this numerically-controlled turret drill handles about 90 pct of the drilling-tapping jobs in the average shop with a single tool complement. It's 32 spindles store all the reaming, tapping, milling and counter-boring tools that are needed. They're ready for action at the command of a simple punched tape. The spindles index to the work by the shortest route. The control system accurately selects and positions the turrets to 0.0001 in. (Fosdick Machine Tool Co.)

For more data circle No. 32 on postcard, p. 101

Vacuum-Furnace Chambers Assure Uniform Cooling



Providing one of the largest commercial heat-treating facilities of its kind in the U. S., two water-cooled vacuum-furnace chambers operate up to 2600°F. Spiral baffles in the water jackets promote uniform cooling. Sealing covers, with O-ring gaskets, permit fast loading and unloading. At the same time they'll hold a 0.1-micron vacuum. The all-welded furnace vessels have steel jackets and the interior walls are stainless. They process work as large as 36-in. diam with a 48-in. height. Stacked work carriers handle smaller components. Typical uses of the furnaces include vacuum hardening, annealing, brazing, degassing and sintering. (Rolock Inc.)

For more data circle No. 33 on postcard, p. 101

Milling Spindle Supplies Constant Horsepower

How do you condense the most horsepower into a minimum-size spindle and still have flexibility? A constant-horsepower unit may be the answer. Most milling operations demand increased torque when cutting speed decreases. With this hydraulic milling spindle, torque varies indirectly with speed. The result is constant horsepower, regardless of the speed selected. Heavy chip load per tooth at any speed means time and money saved. Maximum stock removal results when the cutter diameter suits the surface speed of the cutting tool. Flexibility is inherent in the combination of variable speed with constant horsepower. This means easier conversion to new designs. The spindles come in standard units from 10-50 hp. (Colonial Broach & Machine Co.)

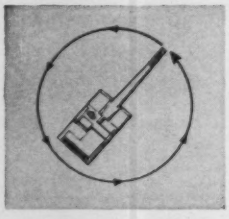
For more data circle No. 34 on postcard, p. 101

SILENT HOIST
KRANE KAR

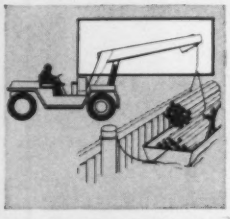
SAVES
$478.03 EVERY MONTH

says V. JAMES DeNAPLES
Technical Services Foreman
Norma-Hoffman Bearings Corp.

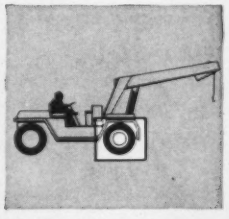
"This versatile yard crane simplifies our materials handling operations, cutting travel trips and saving us a considerable amount of work and time. Our KRANE KAR speeds unloading of incoming materials, transports and stacks them at storage . . ." RESULT: Monthly net savings—$478.03!



360° BOOM ROTATION—Hydraulic Crane revolves on heavy-duty, double-race ball-bearing turntable. Special manifold permits continual rotation and simultaneous, smooth, positive control of hoisting, topping, telescoping.



GREATER WORKING REACH—Boom is pivoted well forward to provide working reach of entire boom length! High boom underclearance permits efficient handling of bulky loads in box cars, trailers, etc.



MAXIMUM SAFETY—Dual traction tires means high flotation and maximum protection against tire blow-out upsets.
Bonus Capacity—Hydraulic outriggers step up working capacity to 24,000 lbs.

2 SIZES: MODEL FAX—12,000 lbs. • MODEL FAY—20,000 lbs.

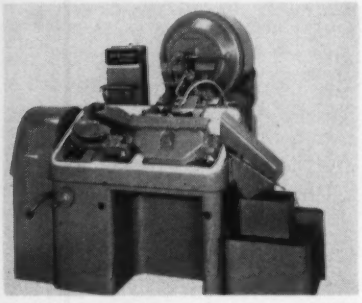
ALSO AVAILABLE:
KRANE KAR—180° SWING BOOM—Mechanical Geared and All-Hydraulic Models. 5 Sizes: 1½, 2½, 5, 10, 12½ ton capacities.

Literature Available:
On 360° Swing Boom—Bulletin No. 99 On 180° Swing Boom—Bulletin No. 79

SILENT HOIST & CRANE CO.
BROOKLYN 20, N. Y.

Speeds Thread Rolling

Capable of producing 135-400 parts per minute, a completely automatic thread-rolling machine rolls thread lengths from ⅛-1½ in. With special dies, these thread lengths can be extended to 3 in. Screw capacity ranges from #2



through #10 on the automatic model. A manual unit handles #0 through #10 screw sizes. Both models feature adjustable starter fingers. These fingers adjust starting height and stroke. (Roy Machinery & Sales, Inc.)

For more data circle No. 35 on postcard, p. 101

Utility Vises

A line of utility vises, designed for rugged use, consists of two sizes. One has a pipe capacity of ⅛ in to 2½ in. The shipping weight is 34 lb. The other will handle pipe from ⅛ to 2 in. Its shipping weight is 19 lb. The hardened steel jaws are replaceable. Serrated steel top jaws can also be replaced. (Wilton Tool Mfg. Co., Inc.)

For more data circle No. 36 on postcard, p. 101

Tape Spooler

Now available is a bidirectional winding automatic tape spooler that may be used with any tape reader. The unit uses standard NAB (NARTB) reels up to 8 inches in diameter for the handling of paper or mylar tape. It has a 1,000-foot tape capacity and winds at 15 ips. The tape is spooled automatically in either forward or reverse direction. Winding in a particular direction is controlled by a tension arm which senses slack in the tape. No

UNITED®

46" x 90" SLABBING MILL

1901 U&FCO 1961

Progress...Leadership United for Sixty Years

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

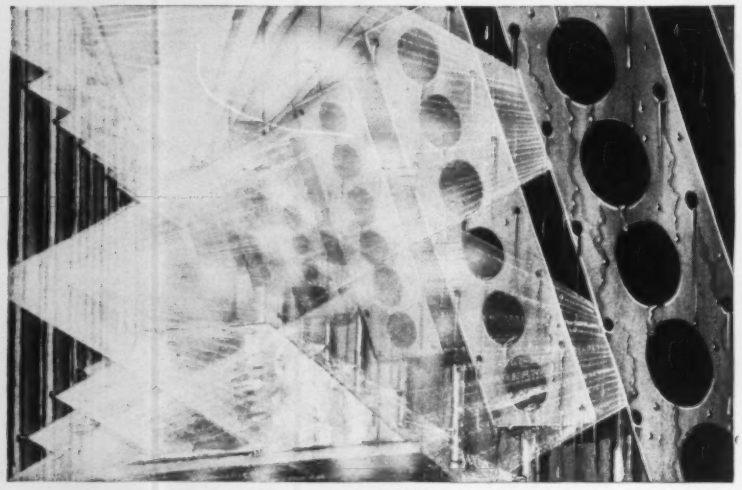
SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

To get more from your spray washer

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS



New Oakite 198 sprays off soils fast . . . protects in-process parts from rust

Users tell us that nothing equals Oakite 198 for cleaning parts in-process. Here's why they think so:

- *It clears off heaviest soils at temperatures up to 180°F, and light soils at room temperature.*
- *Metal chips wash away under its action.*
- *When dry it leaves a protective film that prevents the rusting of machined or ground parts prior to assembly—yet it doesn't affect accurate gauging.*

Now largely used in automotive plants, Oakite 198 is proving its economy as well as its unique effectiveness in providing fast, smut-free cleaning plus rust protection. It works in single or multistage machines, at economical concentrations.

Oakite 198 is just one of a complete line of Oakite materials for machine cleaning. There are non-foaming solvent agents for heaviest duty cleaning, alkaline cleaners for removing moderate to light soils. When you ask Oakite you can be sure of getting a cleaning compound designed to give you best possible results, designed to reduce your "per unit" cost. You can be sure, too, of getting prompt, intelligent in-plant service from your local Oakite man.

Send for Bulletin. Oakite Products, Inc., 24 Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE

SCIENCE

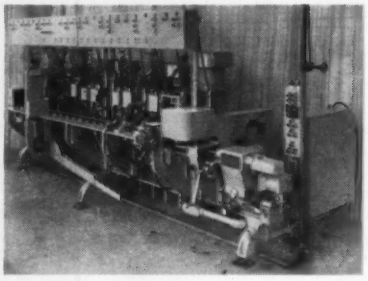
over 50 Est. 1909 years' leadership in industrial cleaning

external control signal is required for operation in either direction. (Electronic Engr. Co.)

For more data circle No. 37 on postcard, p. 101

Transfer Line

With standard machines and movements, an automatic transfer

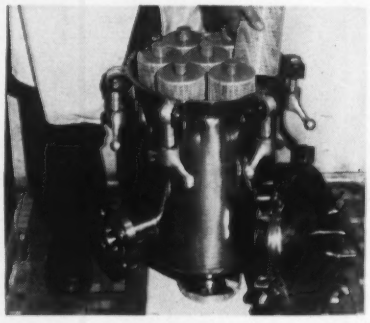


line can be changed from one assembly to another in only a few minutes. This line features individual shot pinning for accurate fixture positioning. Protection safeguards eliminate damage when it's physically impossible for station movements to carry out operations. (Russell T. Gilman, Inc.)

For more data circle No. 38 on postcard, p. 101

Filters at 170 GPM

Hydraulic and other petroleum-based fluids and water can be filtered to absolute 3-micron cleanli-



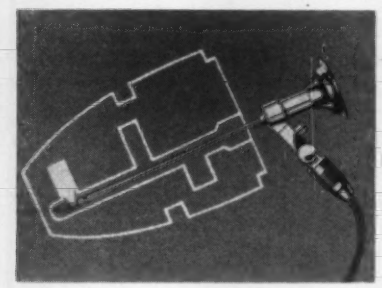
ness by a filter assembly at rates up to 170 gpm continuous flow. No need for recirculation or preliminary filtration. The unit features extremely high dirt capacity. Its heart is a combination, fiberglass-membrane, throwaway cartridge. The fiberglass provides fine filtration coupled with large dirt capacity. The membrane removes all particles larger than 3 microns and prevents

migration. The primary cartridges are followed by the third-stage, wire-mesh filter elements which provide 98-pct 5-micron filtration and absolute 18-micron filtration. The mesh elements protect the system during element changes. (Pall Corp.)

For more data circle No. 39 on postcard, p. 101

Inspects Small Bores

Complete inspection of very small bores is possible with a new optical instrument. A short shaft length with 0.145-in. diam permits inspection in cases where no other meas-

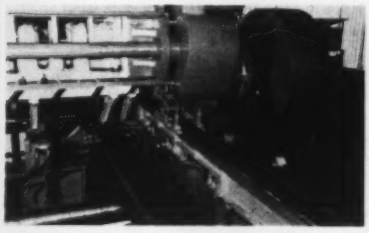


urements or checks are possible. Right-angle vision is provided by a lens system that boasts high optical efficiency. This lens system produces a magnified image that's clear, corrected and sharply defined. Power can be supplied by a battery-type handle or by a transformer. (Welch Allyn, Inc.)

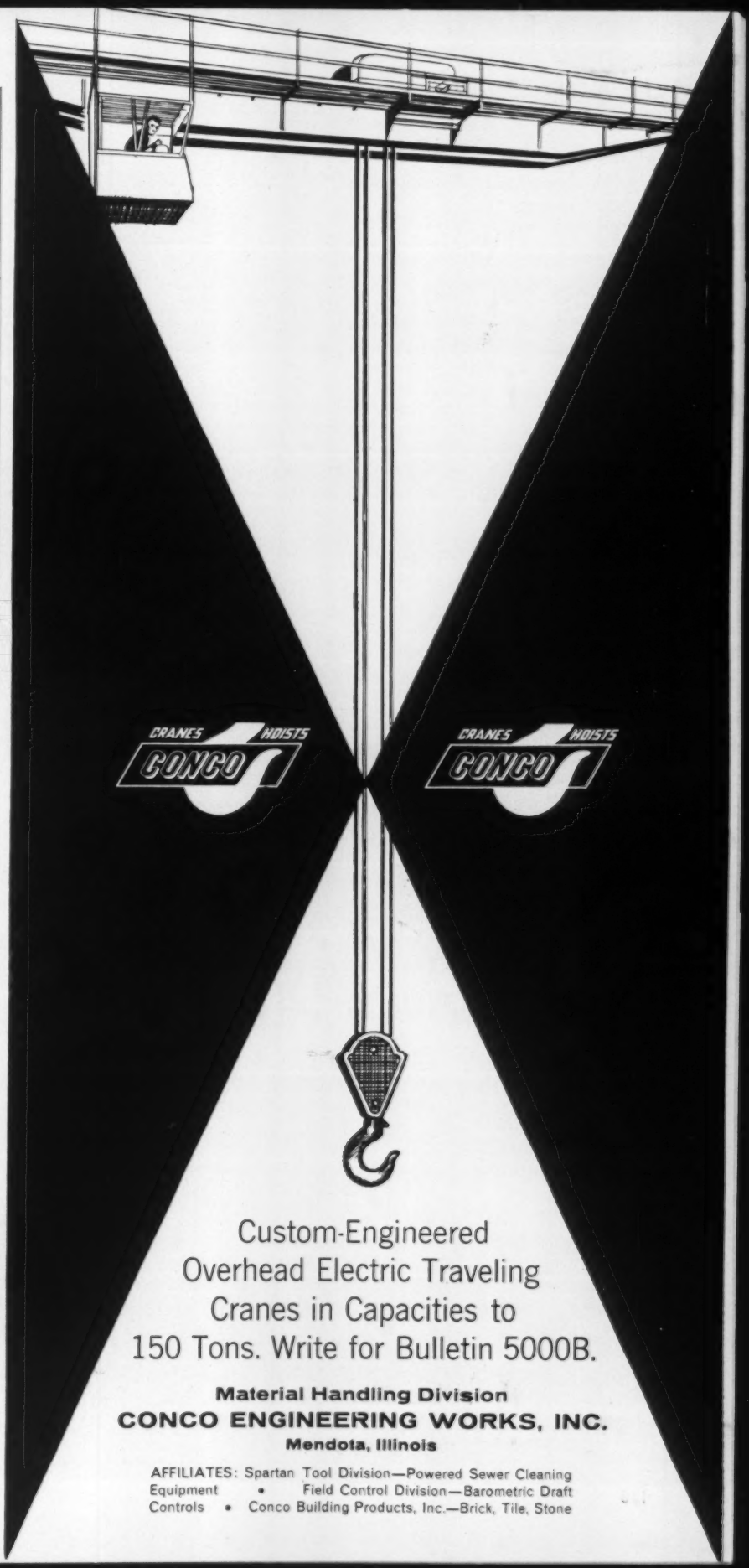
For more data circle No. 40 on postcard, p. 101

Cuts Machining Costs

Completely automatic, a high speed positioning and programming system offers accuracy and cost reductions for metalworking jobs. The system controls machine-tool work on loads as heavy as 6 tons in lengths up to 150 ft. It operates at 150 fpm with an accuracy of 1/32



in. over the full length. Punch cards program the units, although the system may be adapted to other programming media. Servo valves



Custom-Engineered
Overhead Electric Traveling
Cranes in Capacities to
150 Tons. Write for Bulletin 5000B.

Material Handling Division
CONCO ENGINEERING WORKS, INC.
Mendota, Illinois

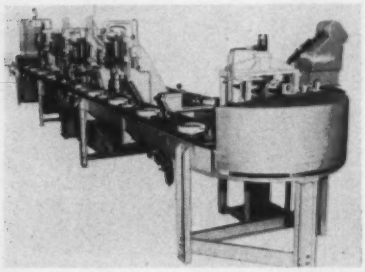
AFFILIATES: Spartan Tool Division—Powered Sewer Cleaning Equipment • Field Control Division—Barometric Draft Controls • Conco Building Products, Inc.—Brick, Tile, Stone

virtually eliminate backlash assuring close-tolerance tool positioning. (Sanders Assoc., Inc.)

For more data circle No. 41 on postcard, p. 101

Transfer Machine

Combining automatic and manual assembly of automotive, power-brake booster cylinders, a transfer machine boosts production. It limits automatic stations to trouble-free operations. This results in a

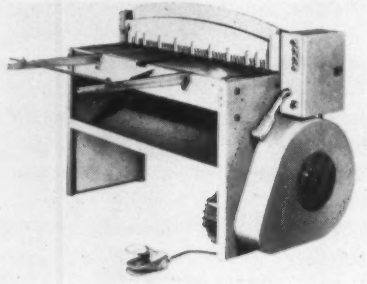


minimum of costly machine upkeep. The machine has 30 working platens on each side. It produces 250 assemblies per hr with 8 operators and 5 automatic stations. A final-assembly fixture is on every third platen. The two adjacent platens store parts and handle sub-assembly operations. (Visi-Trol Engr. Co.)

For more data circle No. 42 on postcard, p. 101

Power Shear

Featuring cutting action that takes place within one fifth of a second, a high-speed power shear cuts ferrous and non-ferrous material. It shears widths up to 50 in. and as heavy as 16-gauge mild steel at a rate of up to 160 strokes per minute. This speed makes the machine adaptable for use on conveyor and run out lines. Instantaneous cycling is possible because the shear has a self-adjusting electric clutch built into the flywheel and connected directly to the motor by a triple v-belt drive. This eliminates gears and makes for quieter operation. (O'Neil-Irwin Mfg. Co.)



For more data circle No. 43 on postcard, p. 101

Ultra-Pure Silver

A new atomic recombination process produces silver 99.999+% pure. The only spectographically detectable elements are iron, copper, silicon and manganese—all less than one part per million each. This silver is available in fine crystalline powder, vacuum-cast ingots, strip and foil. (High Purity Metals, Inc.)

For more data circle No. 44 on postcard, p. 101

Low Cost Drills

Two new electric drills are reported to be the lowest priced industrial-type ball-bearing drills in their respective sizes. These new-

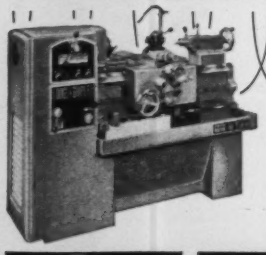
Dalmotor Div., Yuba Consolidated Industries . . . "used in model shop for turning, facing and boring all sorts of experimental parts."

Raytheon Manufacturing Co. . . . "used for turning, facing and boring operations on brass, aluminum and steel workpieces."

Over an extremely wide range of American industry . . . for tooling, production, maintenance and experimentation . . . the Lodge & Shipley 1307 HI-TURN (10") Lathe is making a record of true economy. With literally dozens of big lathe features, the HI-TURN is still priced substantially below many lathes having fewer features, less horsepower and lighter construction.

Turn your attention to HI-TURN. Find out why these and many other lathe users are ordering and reordering HI-TURN Production and Tracer Lathes to replace or supplement larger, far more costly lathes. For complete details, request Bulletin 331, The Lodge & Shipley Co., 3073 Colerain Ave., Cincinnati 25, Ohio.

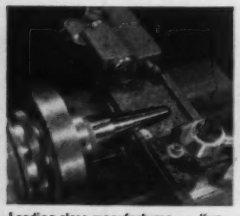
THEY'RE ALL TURNING TO Hi-Turn



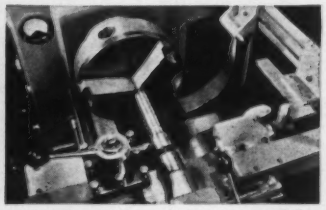
. . . your Lodge-ical choice

Lodge & Shipley

Rocketdyne Div., North American Aviation . . . "held OD turning to a tolerance of .0003" "

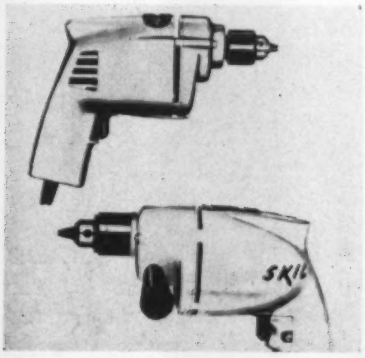


Leading glass manufacturer . . . "unheard of economy, ease and speed of production" on machining and reworking glass bottle tooling.



Indiana Gear Works . . . has earned a reputation of "excellent for high production."

comers are available in ¼- and ⅜-in. sizes. The ¼-in. model has a 2.5-amp motor, helical gears and a lightweight diecast - aluminum housing. The larger model features a 2.8-amp motor, the same type of housing and an auxiliary side han-

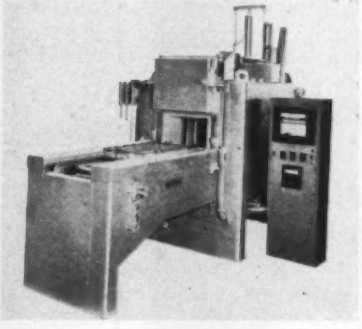


dle for extra control and better leverage. Both models incorporate ball - bearing construction. (Skil Corp.)

For more data circle No. 45 on postcard, p. 101

Heat-Treating Unit

Providing automatic, straight-through operation from loading to quench, a heat-treat furnace comes in six standard sizes of gas-fired or electric models. The complete unit consists of automatic loader, heat treat furnace, atmosphere cooling chamber, oil quench tank, quench elevator, forced-agitation oil pump,

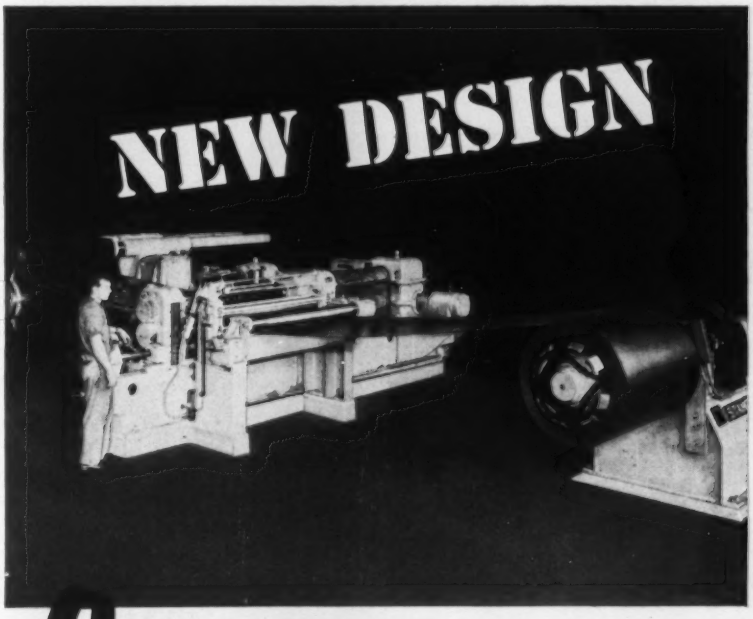


oil cooler and control panel. With the controls and cycle timers set, the furnace automatically heats work at a selected temperature under a prepared atmosphere. It holds for the time selected, and then moves the load to the quench chamber. There, it is oil quenched or cooled under atmosphere. When the selector is set for an oil quench, the work is automatically lowered into the quench bath, held there for the desired time, and then raised to the drain position. (Hevi-Duty Electric Co.)

For more data circle No. 46 on postcard, p. 101

Weighs Hot Metal

For accurate, net-weight determinations, an electronic, hot-metal-ladle scale uses tension-mounted cells. A crane lowers the empty ladle on a weigh bridge that is supported by three tension mounted electric load cells. As the ladle is filled with hot metal from a bottle car, the load is indicated on a 20-in. circular scale located in a scale house. At the same time, two remote printers record weight on a punched tape for tabulating purposes. The scale has a total weighing capacity of 250,000 lb of live



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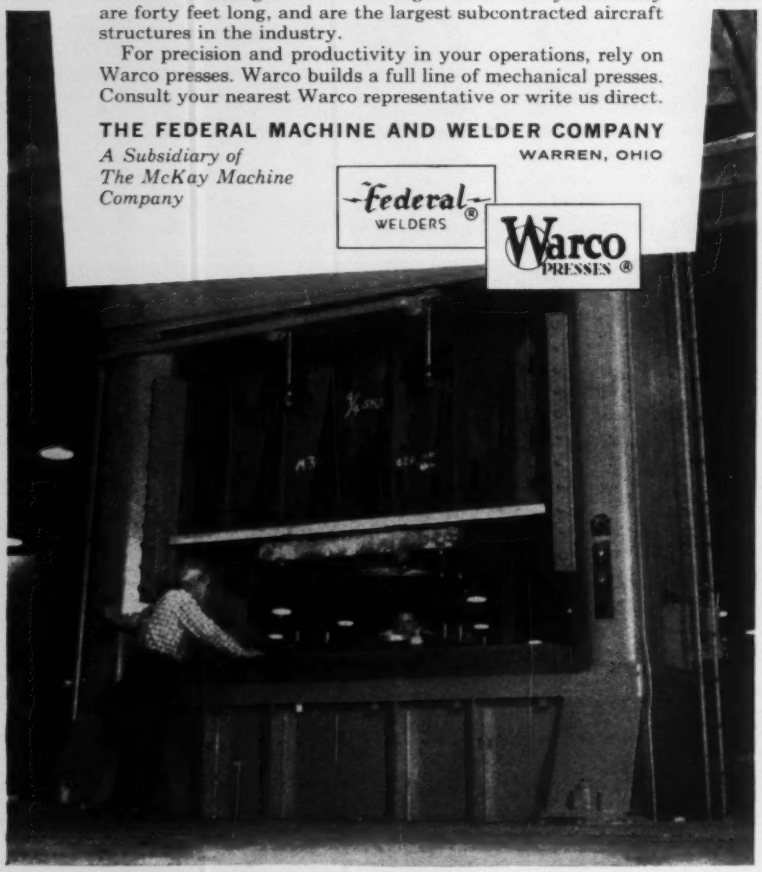
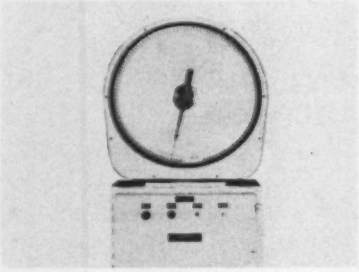


load and reads out with an accuracy of ±1/4 pct. Tension-mounted load cells are protected with a steel plate and located at the

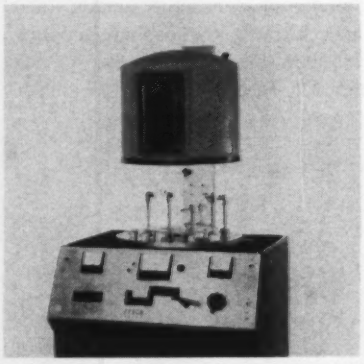


top of pit so that spilled or splashed molten metal cannot damage the cells. (Gilmore Industries, Inc.)

For more data circle No. 47 on postcard, p. 101

Lab Vacuum System

Ideal for high vacuum depositions of lightweight metals, a vacuum system features an implosion-proof, 18-in. diam aluminum bell jar. This jar can be evacuated within 5 minutes to a vacuum of 1 micron of Hg with an ultimate vacuum of 2×10^{-6} mm. A large plastic window offers full visibility of the vacuum-cham-



ber interior. Backstreaming from the diffusion pump is reduced by a water-cooled baffle. (Central Scientific, a div. of Cenco Instruments Corp.)

For more data circle No. 48 on postcard, p. 101

Protects Bulk Materials

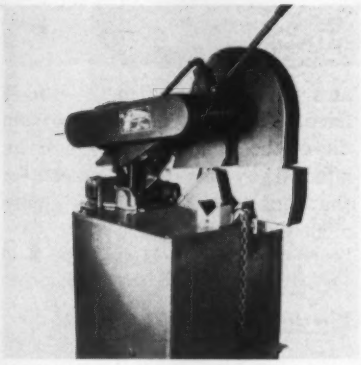
Improved formulations of compounds protect outdoor storage piles of bulk materials against loss from wind or rain erosion. The spray-

applied solution contains specially developed additives for maximum coverage and penetration. The new formulation is a blend of synthetic, organic, long chain polymers in a water base. Protection lasts more than a year. (The Johnson-March Corp.)

For more data circle No. 49 on postcard, p. 101

Oscillating Cutter

With an oscillating feature, this new abrasive cutting machine slices up to 4-in. solids and most 6-in. shapes. Oscillation, the forward and backward movement of the wheel as it cuts, gives the user extra cutting capacity, good quality cuts

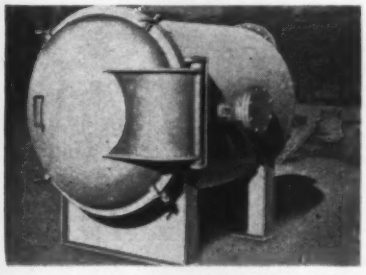


and economy through longer wheel life. A 20-hp motor provides the power to cut at 3-4 seconds per sq in. Also available is an air-operated power head which increases wheel life 30 pct and insures a uniform cut. (Beaver Pipe Tools, Inc.)

For more data circle No. 50 on postcard, p. 101

Altitude Chambers

A recently-introduced line of vacuum chambers offers manufac-



turers and environmental engineers two types of chambers from 1:5-12 ft in diam, with lengths up to 12 ft. The standard units simulate alti-

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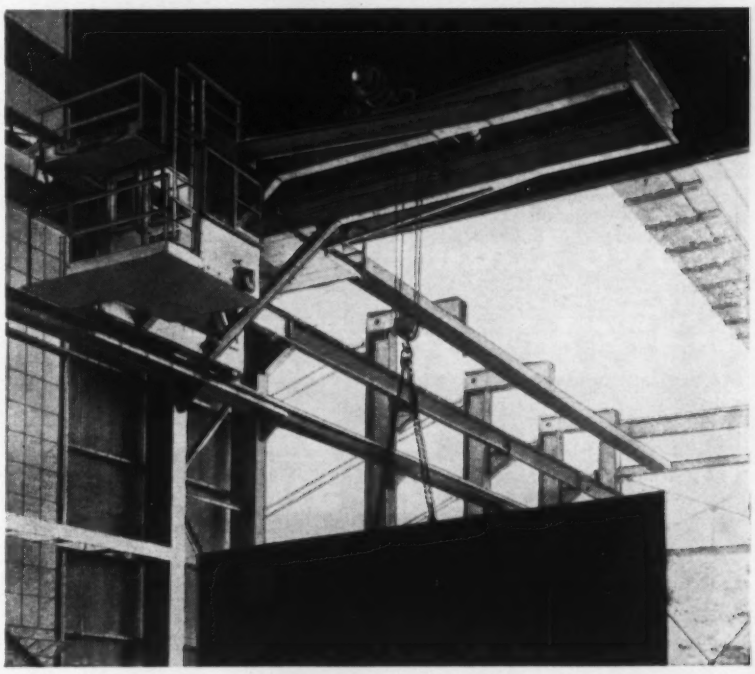
DIFFERENT—because each job is different



Shepard Niles Cab Operated Wall Crane

This Shepard Niles Job-Mated QUALITY Crane was specifically designed for the actual job it is doing. Each component – motors, controls, frame, gearing, trolleys, brakes – was designed and built by Shepard Niles to give the best overall crane performance under unique operating and load conditions.

Your load-moving problem will receive this same careful consideration at Shepard Niles. Even in so-called "standard" applications, our insistence on selecting the right components to meet exact on-the-job conditions, results in a custom-built crane. Care like this in our plant means lower operating costs and increased efficiency in yours.

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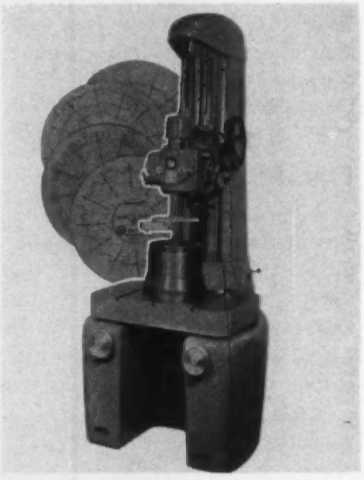
tudes to 250,000 ft, or about 10 microns. The high-vacuum series, with a stainless steel vessel, reaches vacuum levels to 7-mm Hg. This corresponds to altitudes in excess of 700,000 ft. The chambers come with mechanical or high-vacuum diffusion pumping assemblies. If desired, they adapt for use with customer-supplied pumps. (Bethlehem Foundry & Machine Co.)

For more data circle No. 51 on postcard, p. 101

Measures Roundness

The need for accurate gaging of errors in roundness is becoming increasingly important for space vehicles and for automated production lines as well. This new roundness measuring instrument permanently records measurements of roundness, concentricity, coaxiality, squareness and interrupted circular shapes on an inkless polar chart. It operates while the test piece remains fixed. Therefore, the rotating spindle of the polar chart remains unaffected by the size, balance or shape of the work. (Engis Equipment Co.)



For more data circle No. 52 on postcard, p. 101

Unusual Lamp

Combining high light output with good color quality, new lamps use thin, tubular envelopes of crystalline alumina ceramic. This permits the use of alkali metal vapors at higher temperatures and pressures than ever before practical. Still under development, they permit the study of light and color from metallic vapors that could not be used with previously available bulb materials. The units are about the size of a king-size cigarette. (General Electric Co.)

For more data circle No. 53 on postcard, p. 101

4-Sided Conveyor

A new, 4-sided, moving-tunnel conveyor is actually a combination of four metal-belt conveyors in a single drive unit. It's used as a take-off unit for an extruder or for the continuous foaming of plastics. The height of the rectangular cross section is easily adjusted by raising or lowering the top conveyor. Adjustable-spring mounting of the top

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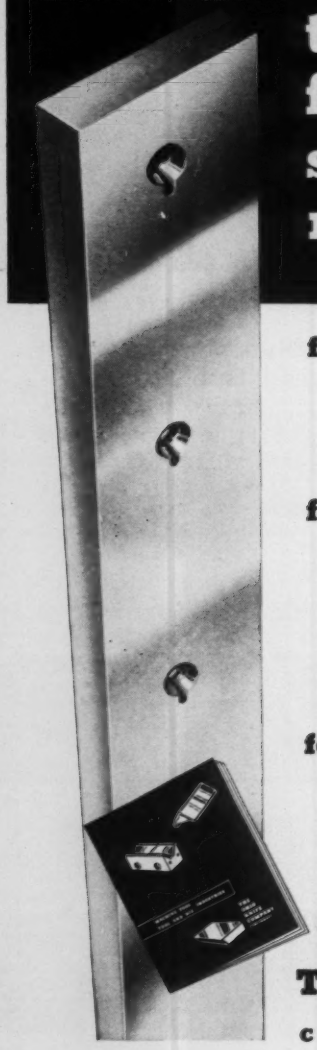

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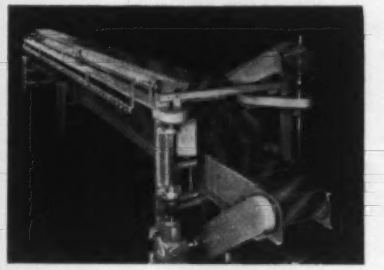
conveyor compensates for variations in the output of the extruder or the

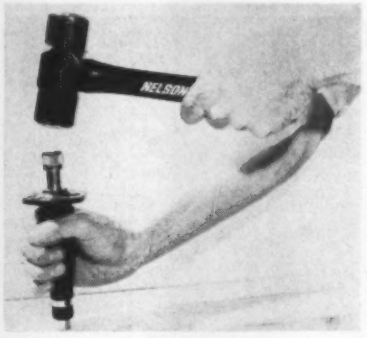


foaming head. It also permits control of working pressure. Variable-speed drives are available with or without remote control and speed indication. (M-H Standard Corp.)

For more data circle No. 54 on postcard, p. 101

Fastens by Hand

Designed for all light fastening to concrete, masonry or thin steel, a new 4-purpose, hand-fastening tool requires no external power supply. It doesn't need any extra attachments and should be a natural where no electrical or air power is available. The tool sets threaded or wire-loop drivestuds in concrete,



concrete block, and light-guage steel without drilling, filling or plugging. A reversible chuck doubles as a masonry drill holder for the usual tap and twist method. With an adapter, the tool handsets drill anchors in concrete, brick or stone. (Gregory Industries, Inc.)

For more data circle No. 55 on postcard, p. 101

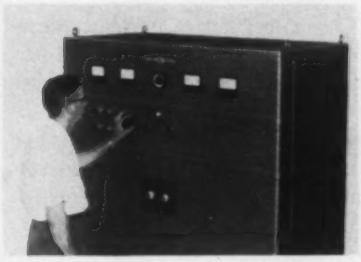
Sheet Metal Clamp

Precision hole alignment and good gripping power in holding sheet metal during riveting and welding operations are provided by a new clamp. It gives precision four-point alignment throughout its entire length. The clamp is available in popular size ranges for holes up to ¼ in. and for 1 in. thickness of material. It comes with wing, hex or bar nut. (Monogram Precision Industries)

For more data circle No. 56 on postcard, p. 101

Saves Space

Compact design is the salient feature of a new cold-wall vacuum furnace. It should be of special interest to small users who have a premium on floor space. A simple connection



to water and power supply installs the complete unit. Cold-wall, heat-

WASHERS

and the case for high-strength steel bolting

Structural engineers, architects and contractors are increasingly aware of the superiority of high-strength bolted steel construction . . . in preference to riveting. Speed, economy, quiet, higher fatigue resistance and permanent joining result.

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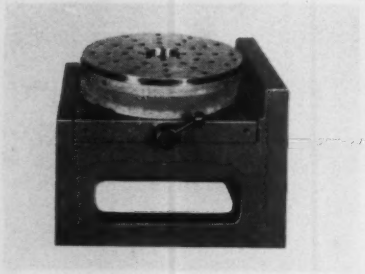
ing-chamber design prevents warm-up of auxiliary equipment and surrounding work areas. The furnace reaches its maximum heat of 1200°C in a matter of minutes; and cools almost as rapidly. Vacuums are in the 10mm Hg range. (C. I. Hayes, Inc.)

For more data circle No. 57 on postcard, p. 101

Indexing Table

A new 7-in. diam rotary indexing table provides whole-degree angular

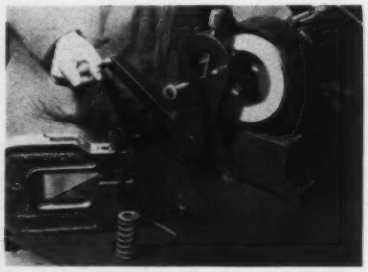


indexing. It's accurate to within ¼ sec of arc. This is equivalent to 0.000012 in. at a 20-in. diam. The table automatically locks into exact position as 360 precision-ground teeth mesh. Wear is no problem. Accuracy actually increases with wear as teeth lap each other. (Michigan Tool Co.)

For more data circle No. 58 on postcard, p. 101

Sharpens Dies

A built-in universal fixture provides a handy, low-cost method of



sharpening punches and dies in this portable, bench-type grinder. It accepts most makes and types of standard or special punches and dies. You don't need to tie up expensive surface grinders when it's on the job. Simple design and operation rules out specially-trained operators. The enclosed, fan-cooled motor is permanently lubricated to give dependable operation and long bearing life. (Punch Products Corp.)

For more data circle No. 59 on postcard, p. 101

Automatic Shear

A flying shear forms-up 12,000 elbow blanks per hr. It evenly feeds metal, pulls metal from the coil, slits it, shears it, moves it through the shear and feeds it into a fabrication machine. Unused metal is returned and rewound into a new roll. Slitter blades cut any metal that doesn't shear harder than 0.075 galvanized steel. Each slitter blade has four cutting edges. Each can be rotated four times before it needs sharpening. (Welty-Way Products, Inc.)

For more data circle No. 60 on postcard, p. 101

Power Strapping Tool

This unit, a portable, power-operated, combination strapping tool, cuts manual operations to a

minimum. Air power does all the work. It engages the feed wheel, tensions the strapping, applies the

seal, severs the strap from the coil and disengages the feed wheel. A nested seal simplifies loading into the tool and allows loading of partial stacks. Weight is only 22 lb. Its universal suspension bracket permits vertical or horizontal operation. Strap tension is adjustable. (Signode Steel Strapping Co.)

For more data circle No. 61 on postcard, p. 101

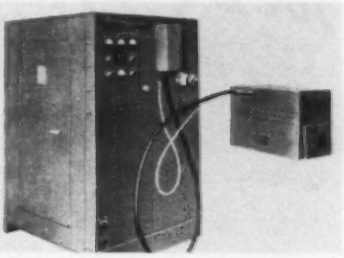
Material-Supply Pots

Designed especially for the 2-component chemical industry, these material-supply pots represent a new concept in material-supply equipment. Made of clad aluminum, they're suitable for 125 psi or maximum vacuum. The entire top opens quickly for filling with viscous fluid and for cleaning. Solenoid valves control vacuum and pressure lines, as well as the material outlet. An automatic timer allows presetting any controls for heating, evacuating and agitation before the start of a production shift. (Pyles Industries, Inc.)

For more data circle No. 62 on postcard, p. 101

2-Frequency Generator

One unique feature provided by this compact generator is the remote, 4-megacycle, oscillator tank circuit which offers users a choice of process method. The work may be moved with the inductor coil stationary, or the inductor coil moves with the work in place. The equipment provides output power at frequencies of 450 kc or 4 megacycles. Changeover from one to the other is rapid and convenient. It's rated at 10-kw continuous output for both output frequencies. Full-load input is 25 kva at 95-pct power factor, 3-phase, 60-cyl, 220/440-v. Either saturable reactor,

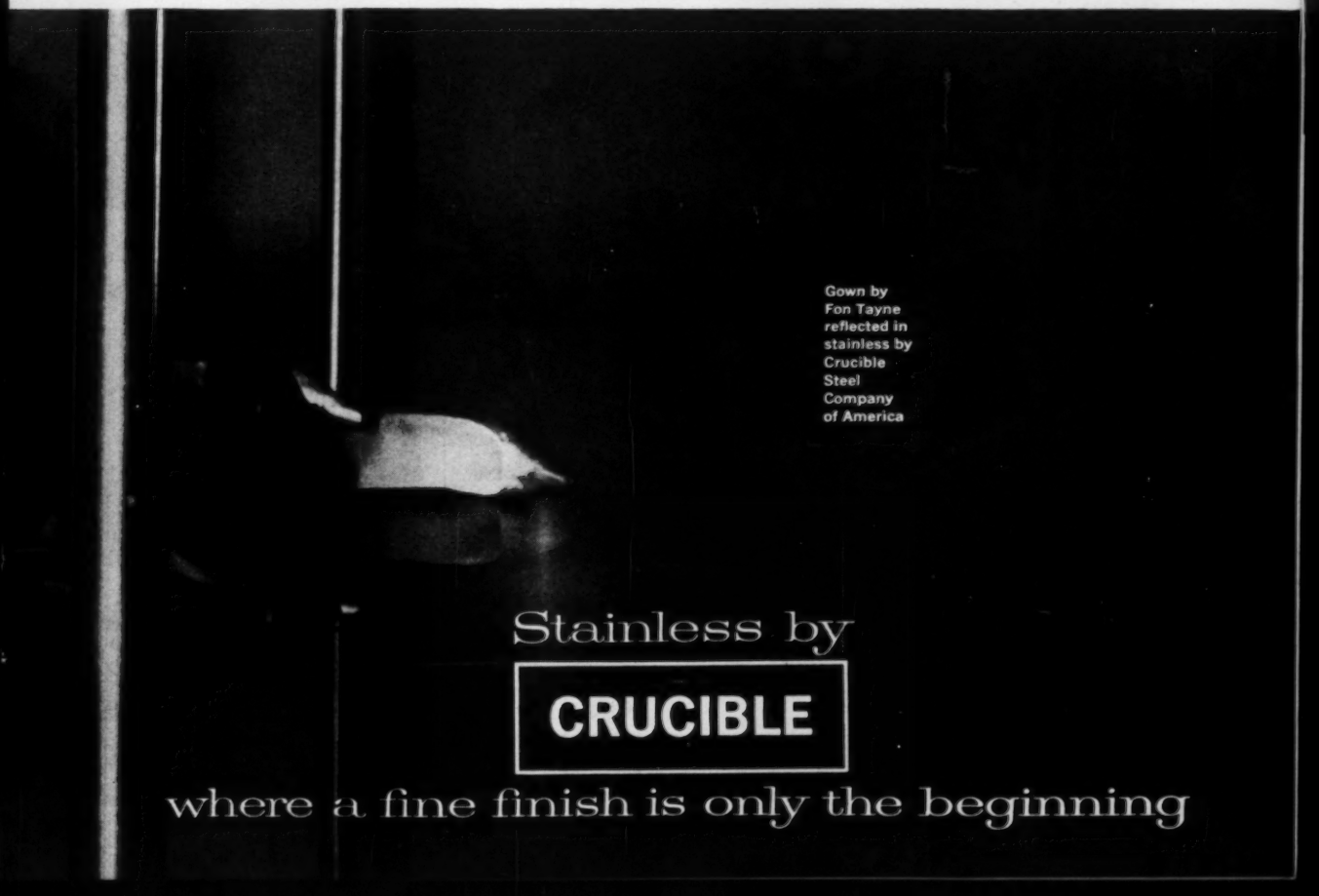


thyratron or powerstat output control is available as a standard option. (Westinghouse Electric Corp.)

For more data circle No. 63 on postcard, p. 101

Holds More Wire

Containing 500 lb of hardfacing wire for automatic welders and track rebuilders, a new container does away with four coil changes. This extra capacity saves two hours of downtime per container. Wire is guarded against dirt, dust and mois-



IMPERIAL D-C MOTORS

for Dependable Heavy-Duty Service

Imperial D-c Motors meet the ever-increasing demand for dependable, heavy-duty drives in nearly every industry today. Over seventy years of d-c design and application experience is behind the manufacture of these motors. Ratings from 1 through 125 hp., for constant or adjustable speeds with shunt, series or compound windings are available in all standard enclosures. When you choose *The Imperial Line* you are assured of motors that stay on the job longer... keeping production high at lower costs. Write for bulletin or contact the sales office nearest you.

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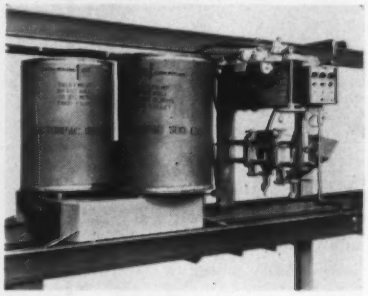
Semi-Guarded D-C Motor

Drip-Proof D-C Generator, SAE Flange Mounting

Totally-Enclosed Fan-Cooled D-C Motor

Two-Bearing Motor-Generator Set

ture. Storing and handling the units is easy. Automatic wires now available in the containers come in ⅛-



and 5/32-in. diam. Their main use is in the buildup of rollers, idlers and other track parts on tractors and shovels. (Victor Equipment Co.)

For more data circle No. 64 on postcard, p. 101

Cut-Off Machine

Increased power and capacity, with no rise in price over the previous model, plus a hollow-arbor mist coolant and retracting size gage are all features of a 12-in. cut-off machine. It cuts all bar stock and angles usually used in plant upkeep, and handles 1½-in. steel rod on a production basis. In ferrous work, it's abrasive wheel cuts to a 0.005-

in. tolerance. This accuracy results from a combination of high power (5 hp) and surface speed (over 12,500 fpm), plus the advanced size gage that compensates for heat expansion. (Rockwell Mfg. Co.)

For more data circle No. 65 on postcard, p. 101

Order Pickup Gains Momentum

Orders continue to move ahead on a broad base. The gloomy automotive picture continues to haunt the mills, however.

Unless there is a major auto upturn, operations will move ahead with the general economy.

■ The recent undertone of optimism in the steel market has strengthened.

Indications of the better market are modest and don't add up to a full-scale advance. But operations are beginning to inch up and some mills are looking for an operating rate in the 60's (as a percent of capacity) in the second quarter.

Although the industry officially has scrapped the "percent of capacity" as a way of measuring operations, some mill people continue to use the term internally.

The Factors—These signs of improvement in the market are noted:

1. There is a noticeable pickup in general orders.

2. Most users are now buying for consumption, indicating that inventory cutbacks are near an end.

3. The plate and structural market is moving up slowly.

4. Many small users who have been out of the market for months are coming in with modest orders.

5. The tinplate market is strengthening.

Auto Outlook Gloomy — However, the automotive steel orders continue to lag. This will prevent any major upsurge in the next few months while the 1961 model year runs out. Overall improvement will be geared to the general level of the economy.

Up to now, the pickup in general business has more than compensated for cutbacks in automotive orders. However, the pickup has not resulted in the same level of improvement for all mills. Mills with a broad base of products are now faring better in the recovery.

Inventory Control—In contrast, the news from Detroit continues to be gloomy. No pickup in steel orders from automakers is in sight at this time. One mill's February automotive tonnage was 15 to 20 pct lower in February than in January, with little gain in sight.

To make matters worse, automakers are still trying to adjust their steel inventories. They are the exception to the rule that inventory cutbacks are at an end. Cutbacks in production schedules have placed some automakers in the long position in steel stocks.

February production of cars was about 400,000. March production is now scheduled at about the same figure, although a 450,000 level had been predicted a couple of weeks ago.

For some automotive divisions, steel buying for the 1961 model year has just about run its course in terms of major steel buys.

Some Indications—Among the automakers, the pattern varies, but the conclusion is the same. Buick's April buy of steel is very low and May's depends on spring sales. Oldsmobile's April buy is also low, to show some examples.

Automakers still think a couple of good 10-day sales periods this month might change the gloomy picture. But at this point, it seems to be wishful thinking. However, a seasonal upturn could take place if the weather improves.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	88	84	80	132
Buffalo	77	72	74	144
Pittsburgh	79	75	70	143
Youngstown	69	79	84	150
Cleveland	71	72	78	163
Detroit	86	89	86	148
Chicago	92	93	90	144
Cincinnati	84	90	85	148
St. Louis	108	107	99	124
Southern	88	90	75	129
Western	100	101	101	134
U. S. Index	84.8	84.9	81.8	142.0

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	1,580	1,582	13,568	24,265
Ingot Index				
(1957-59=100)	84.8	84.9	80.9	144.7
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel, base (cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$35.83	$34.50	$32.50	$33.83
No. 2 bundles	$26.17	$24.83	$22.83	$21.83

Cost Improvement Gains Grow

Edmund Pfeifer, director of purchases, Lukens Steel Co., strives for cost improvement.

He feels such a program, plus quality, is the most important service a vendor can offer the purchaser.

■ Company-wide participation is the key to cost improvement success at Lukens Steel Co.

The purchasing division alone has exceeded $500,000 per year in cost improvements since a formal program was organized as a staff function two years ago. Edmund Pfeifer, director of purchases, who came to his present position from sales in 1958, believes cost improvement, plus quality, is the best service a vendor can offer the purchaser.

Two-Part System—The Lukens program is operated on two levels: Supervisory and suggestive. The latter entails a suggestion awards program.

The supervisory system is based on data developed through supervisors. All supervisors establish goals for their operations. Quarterly reports listing progress against the annual goal are prepared. And organization and division heads review performance periodically, giving aid and counsel where needed.

Full Participants—Spending over $50 million per year for purchased goods and services, Mr. Pfeifer's purchasing staff of 18 are all full participants in the cost improvement approach. Buyers' goals for the year are often reviewed. Value analysis is a big part of every buyer's job.

Purchasing has the responsibility of coordinating the efforts of the vendor with those of plant personnel at Lukens. It brings a cost improvement proposal to a successful conclusion.

Types of Savings—Examples of this practice, in which both the supplier and customer participated to effect a cost improvement:

1. Lukens formerly used 3000 ft of fibre core wire rope each month for the electric furnace ladle. By purchasing wire core cable, only 1000 ft per month is needed. A saving of $5000 per year resulted.

2. By setting up standard specifications for all lubricants, Lukens has reduced its costs for three items by $36,000 per year. In one instance a single specification now does the work which previously took nine different lubricants.

3. In switching from manganese steel castings to alloy castings, Lukens saves $46,000 per year in a single application.

Inventory Control — Inventories pose a major challenge for Mr. Pfeifer. This year prices have been very competitive and on the down side, although the scrap market has been "very bullish."

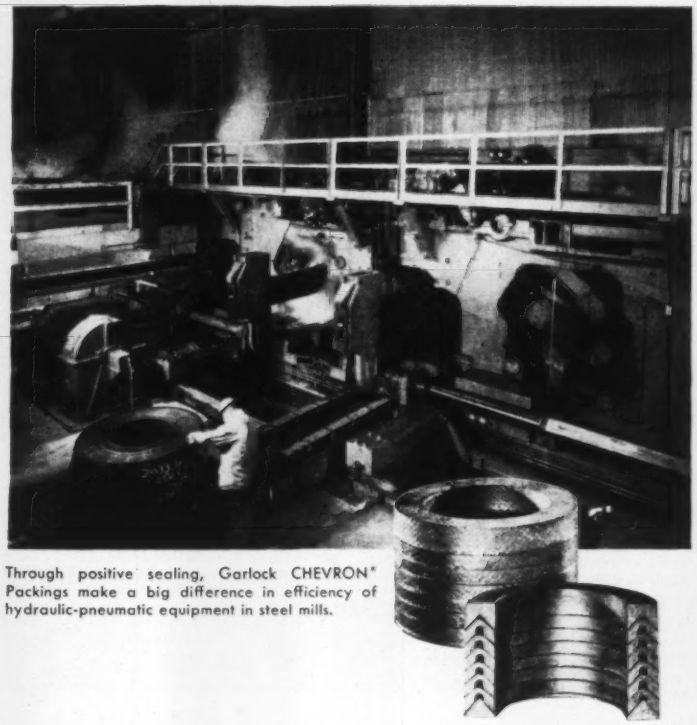
"You can never feel completely satisfied," he says. "We're continually taking steps to have better control of our stocks. Not only from a record-keeping level, but also with regard to receipt, storage and disposition."

Responsibility for inventories should be in one spot, Mr. Pfeifer believes. And it's most logical under purchasing "since we can exert the greatest direct control over it."

Reduced Inventories—"It has become popular to say inventories have high carrying costs and should be reduced," he notes. "This is not necessarily so. You can operate on a greatly reduced inventory and have it cost more."

EDMUND PFEIFER: "You can never feel completely satisfied."

ENGINEERED PACKINGS
for Steel Mills



Through positive sealing, Garlock CHEVRON* Packings make a big difference in efficiency of hydraulic-pneumatic equipment in steel mills.

Wherever fluid power is used in steel producing, apply Garlock CHEVRON Packings to increase equipment efficiency.

On rams, plungers and reciprocating-rod applications of all types, CHEVRON Packings seal tight against loss of hydraulic fluids and pressure. Friction and wear, too, are minimized with CHEVRON Packings on the job.

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Order Pickup Isn't Uniform

Not all of the steel mills have noticed an improvement in the volume of orders received.

It depends on a combination of where the mill is located and what products it makes.

■ The pickup in general steel orders is uneven, depending on the products and the location of the mills.

Along the East Coast, a mill specializing in light plate and sheets is doing much better than one that specializes in heavy plate. Structural mills have noticed an improvement in business and believe that fabricators have managed to take some jobs away from another area.

Limited Gains — Mills around Pittsburgh that are heavy in galvanized and tinplate are doing fairly well. Carbon sheet producers are getting more business from general users, but automotive cutbacks are expected to severely limit any gains.

There's little encouragement coming from Detroit. Local mills and steel sales offices are tied directly to the automobile industry. Some of the auto companies have indicated that, for all practical purposes, they are out of the market for the remainder of the 1961 model year. They will buy only what they need to balance inventories. The best that can be hoped for is a spring surge in auto sales, and an early changeover.

In the Midwest the improvement is as much in the attitude as it is in actual orders. Chicago warehouses say February held at about the same level as January. Usually there is a dip in business. While March isn't starting with any great show of strength, steel service centers are encouraged by more inquiries.

Sheet and Strip — There's scattered buying by a variety of users, but automakers are not among them —they've virtually abandoned the market. Reports from **Detroit** indicate some of the automobile companies may be just about through buying much more than spot tonnages for the remainder of the 1961 model year. Even some of the leading makes are easing their purchases. A **Pittsburgh** mill says auto plants are only taking 30 pct of their normal March buys. It looks for future purchases to be geared to weekly production needs. As usual, there are rumors of an early start for 1962 model cars. One mill says steel shipments for "next year's" cars will start as early as May. Generally, just about all sheet products are available for March shipment along the **East Coast.** However, galvanized steel is now being quoted for April delivery by some mills. The market in the **South** for specialty products such as electrical sheet and enameling iron is described as good.

Stainless—There is little or no new strength in stainless sales. A report from **Chicago** indicates that **Midwest** steel service centers have stepped up their mill purchases. But there is some speculation on the **East Coast** that mills are shipping stainless to warehouses on a consignment basis. This helps both compete against mills with their own warehouse divisions.

Plates—Primary products have a lot to do with the level of activity at plate mills. Along the **East Coast,** light plate mills seem to be doing substantially better than those which concentrate on heavy plates. This is true in the **Pittsburgh** district as well. Linepipe orders are taking some light plate. However, plate operations continue to trail other segments of the steel market.

Structurals — Among the heavy steels, structurals are doing better than plates with demand inching upward. **East Coast** fabricators are buying more. Apparently, they have reached out and landed some out-of-the-area jobs. Around **Pittsburgh** the improvement has centered on wide-flange beams.

Warehouses — The new pricing system which eliminated item-quantity extras has finally reached the **East Coast.** One steel service center has already installed it. Others say they will probably adopt it.

Bars—Both Bethlehem Steel Co. and United States Steel Corp. have dropped the extra charge on hot-rolled bar orders that call for all pieces to be a specified length of 20 in. or less. A cutting extra still applies, however. Previously, a buyer specifying a specific short-length was charged an extra or took left-over "shorts" which came from the cutting. A USS spokesman in **Pittsburgh** says the change is due to a "trend" in customer requirements away from odd-length pieces and to technical advances permitting more exact production scheduling. A salesman on the **East Coast** suggests it may also be a move to combat imported bars. Depending on sizes involved, savings to a customer are now $1 to $3 a ton. A report from **Chicago** says foreign mills are running into pricing problems.

PURCHASING AGENT'S CHECKLIST

Probable expansion of export credit guarantees is likely to aid exporters. P. 57

Survey of purchasers finds some gains in new order rate and production. P. 58

New orders for metal cutting machine tools fell off in January. P. 75

COMPARISON OF PRICES

(Effective March 6, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Mar. 6 1961	Feb. 27 1961	Feb. 6 1961	Mar. 8 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Mar. 6 1961	Feb. 27 1961	Feb. 6 1961	Mar. 8 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	11.00	11.00	11.00	11.00
Pig Iron Composites: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$34.50*	$33.50	$31.50	$34.50
No. 1 steel, Phila. area	38.50	38.50	35.50	35.50
No. 1 steel, Chicago	34.50*	31.50	30.50	31.50
No. 1 bundles, Detroit	31.50*	30.50	26.50	31.50
Low phos., Youngstown	39.50*	38.50	34.50	38.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	44.50	52.50
No. 1 mach'y cast, Phila.	49.50	49.50	48.50	51.50
No. 1 mach'y cast, Chicago	49.50*	47.50	46.50	53.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$35.83*	$34.50	$32.50	$33.83
No. 2 bundles	26.17*	24.83	22.83	21.83
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75 15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.00	29.00	29.00	33.00
Copper, Lake, Conn.	29.00	29.00	29.00	33.00
Tin, Straits, N. Y.	100.50†	100.50	100.50	100.00
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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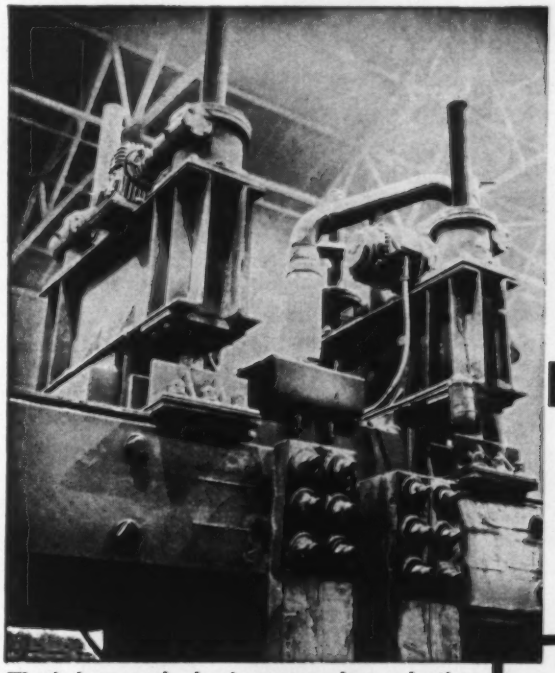
*Appears in the March 2-March 16 issues.



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Scrapmen Await Japanese Orders

Scrapmen in export areas were still waiting for the final word on Japanese buying plans early this week.

Odds are that the Japanese will buy more tonnage in the second quarter.

■ Scrapmen in export areas early this week awaited final word of the Japanese buying plans for the second quarter. Chances are the commitments will come through this week.

However, there are mixed feelings on Japanese tonnage and prices. Most New York scrapmen expect the export orders to be larger next quarter. A Philadelphia broker, though, says there are strong reports that the Japanese will hold out for lower prices.

But other exports are holding firm and from all indications, a change in pattern will result in higher prices.

Overall, scrap prices continue to rise. Chicago leads the increases this week with gains of $2 and $3. Pittsburgh, Cleveland and Detroit prices also jumped sharply.

The IRON AGE composite price for No. 1 heavy melting is up to $35.83. The composite price for No. 2 bundles climbed from last week's $24.83 to $26.17.

Pittsburgh — Prices continue to move upward with slightly increased demand and tight supply. A mill on the fringe of the district is paying $35 to the dealer for No. 1 heavy melting. This is $3 more than the same mill paid last month and $8 more than the lowest price paid last year. A local mill is offering from $28 to $30 for No. 2 bundles. Foundry buying has picked up a little. Prices up to $42 are being given for low phos.

Chicago—An industrial price advance of $4 by a major mill had an explosive effect on the market. Though designed to peg No. 1 heavy melting at $34, the new price was followed almost immediately by new mill purchases. The new price for No. 1 heavy melting is $35. Railroad lists continue to advance also. Price of No. 1 factory bundles was incorrectly quoted at $38 to $39 last week. The price should have been $39 to $40.

Philadelphia—Activity remains steady with export still the big factor. Most dealers and brokers are anxious for the Japanese to come through with firm commitments for the second quarter. They expect these orders will be consummated in the next week. Most prices remain unchanged this week.

New York—The market is very strong—at current price levels. Japanese orders for the second quarter are expected any day now. The trade is guessing whether the Japanese will buy more or less in the next quarter. Most expect heavier buying.

Detroit—A leading mill took some No. 2 bundles off March's industrial list. But shipments are being regulated on a week-to-week basis to control quality and scheduling. Ford Motor Co. bought some foundry steel; Cadillac took 400 to 500 tons of specialty grades; and Pontiac bought a few cars of automotive cast. Some shipments of No. 2 bundles are moving to Pittsburgh.

Cleveland—The market is up $1 based on sales in the Valley. Some specialty grades were sold for $40 and demand for electric furnace bundles is generally strong. In Cleveland, dealers are getting $35 for No. 1 heavy melting from brokers on old orders.

Cincinnati—Market is up $1 as area mills compete for dealer scrap. Production lists will probably go out of the district. Out-of-area demand is strong. A steady movement for the month is expected. Export demand could be partially responsible for current activity.

St. Louis—The market has drifted back into a dull condition. Very little tonnage is moving and prices remain unchanged. Dealers express the feeling that further price increases are in the near future. So they are not anxious to sell now.

Birmingham—An Atlanta mill bought No. 2 heavy melting scrap at quoted prices. A Birmingham electric furnace is expected to return to the market next week. Otherwise the domestic market was listless with only a few cars moving. The export market continues strong.

Buffalo—Most prices are up this week. This is the result of pressure from outside markets. There were no local sales.

Boston—Prices continue to rise in response to steady domestic and export demand. Scrapmen say this situation should continue.

West Coast—Exporting to Japan is still steady. The big question is when the Japanese orders for the next quarter will come through.

Houston — Although there are few local developments, enthusiasm is high on the part of scrapmen. This is partly because there are prospects for higher export prices.

SCRAP PRICES *(Effective March 6, 1961)*

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. punch'gs plate	41.00 to 42.00
Heavy turnings	32.00 to 33.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth	44.00 to 45.00
Rails, 2 ft and under	48.00 to 49.00
RR specialties	45.00 to 46.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	35.00 to 36.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	85.00 to 90.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 factory bundles	40.00 to 42.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs plate, ¼ in. and heavier	42.00 to 43.00
Low phos. 2 ft and under	40.00 to 41.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth	47.00 to 48.00
Rerolling rails	59.00 to 60.00
Rails 2 ft and under	51.00 to 52.00
Angles and splice bars	44.00 to 45.00
RR steel car axles	60.00 to 61.00
RR couplers and knuckles	44.00 to 45.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	44.00 to 45.00
Cast iron wheels	35.00 to 36.00
Malleable	47.00 to 48.00
Stove plate	39.00 to 40.00
Steel car wheels	43.00 to 44.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	90.00 to 95.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	25.00 to 26.00
Low phos. 5 ft and under	41.00 to 42.00
Low phos. 2 ft punch'gs	43.00 to 44.00
Elec. furnace bundles	41.00 to 42.00
Heavy turnings	25.00 to 26.00
RR specialties	44.00 to 45.00
Rails, 18 in. and under	50.00 to 52.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	38.00 to 39.00
Cast iron car wheels	42.00 to 43.00
Malleable	45.00 to 46.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	37.00 to 38.00
Rails, random length	40.00 to 41.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast	37.00 to 38.00
Heavy breakable cast	29.00 to 30.00
Drop broken cast	46.00 to 47.00

Youngstown

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Low phos. plate	39.00 to 40.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	33.50 to 34.50
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	22.50 to 23.50
No. 1 busheling	33.50 to 34.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	40.00 to 41.00
Low phos. punch'gs plate	34.50 to 35.50
Drop forge flashings	33.50 to 34.50
Foundry steel, 2 ft & under	33.00 to 34.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails 2 ft and under	46.00 to 47.00
Rails 18 in. and under	47.00 to 48.00
Steel axle turnings	26.00 to 27.00
Railroad cast	47.00 to 48.00
No. 1 machinery cast	47.00 to 48.00
Stove plate	41.00 to 42.00
Malleable	46.00 to 47.00
Stainless	
18-8 bundles	165.00 to 170.00
18-8 turnings	90.00 to 95.00
430 bundles	80.00 to 85.00

Buffalo

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 busheling	28.00 to 29.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Low phos. plate	35.00 to 36.00
Structurals and plate, 2 ft and under	37.00 to 38.00
Scrap rails, random lgth	37.00 to 38.00
Rails 2 ft and under	47.00 to 48.00
No. 1 machinery cast.	42.00 to 43.00
No. 1 cupola cast.	36.00 to 37.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
Foundry steel, 2 ft	29.00 to 30.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	20.00 to 21.00
No. 1 RR hvy. melting	33.00 to 34.00
Rails, random lengths	37.00 to 38.00
Rails, 18 in. and under	41.00 to 42.00
RR specialties	39.00 to 40.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	35.00 to 36.00
Cast iron car wheels	33.00 to 34.00
Rerolling rails	49.00 to 50.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	34.00 to 35.00
Elec. furnace, 3 ft. & under	34.00 to 35.00
Bar crops and plate	39.00 to 40.00
Structural and plae, 2 ft.	38.00 to 39.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rail, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	39.00 to 40.00
No. 1 cupola cast.	44.00 to 45.00
Stove plate	44.00 to 45.00
Cast iron car wheels	35.00 to 36.00
Unstripped motor blocks	33.00 to 34.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	22.00 to 23.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	2.00 to 3.00
Mixed bor. and turn.	3.00 to 4.00
Shoveling turnings	5.00 to 6.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast.	36.00 to 37.00
Mixed yard cast.	32.00 to 33.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	27.00 to 28.00
Drop forge flashings	25.00 to 26.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	11.00 to 12.00
Heavy breakable cast.	26.00 to 27.00
Mixed cupola cast.	33.00 to 34.00
Automotive cast.	38.00 to 39.00
Stainless	
18-8 bundles and solids	150.00 to 155.00
18-8 turnings	50.00 to 55.00
430 bundles and solids	55.00 to 60.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.50 to $28.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	4.00 to 4.50
Shoveling turnings	7.50 to 8.00
Clean cast. chem. borings	13.50 to 14.50
No. 1 machinery cost.	39.00 to 40.00
Mixed cupola cast.	31.00 to 32.00
Heavy breakable cast.	26.50 to 27.50

San Francisco

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	$27.00 to 28.00
No. 2 bundles	18.00
Machine shop turn.	14.00
Cast iron borings	14.00
No. 1 cupola cast.	46.00 to 48.00

Los Angeles

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	27.00
No. 1 dealer bundles	25.00
No. 2 bundles	17.00
Machine shop turn.	12.00
Shoveling turnings	13.00
Cast iron borings	13.00
Elec. furnace 1 ft. and under (foundry)	42.00
No. 1 cupola cast.	44.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	31.00
No. 2 bundles	21.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$28.50
No. 2 hvy. melting cut 3 ft and under	25.00
No. 1 dealer bundles	28.50
No. 2 bundles	18.00
Mixed steel scrap	20.00
Bush., new fact., prep'd.	28.50
Bush., new fact., unprep'd.	22.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	21.00
Machine shop turn.	8.00
Shoveling turnings	11.00
Cut structural plate 2 ft & under	$44.00 to 45.00
Unstripped motor blocks	26.00 to 27.00
Cupola cast.	33.00 to 34.00
Heavy breakable cast.	25.00 to 26.00

Copper Market On the Uptrend

Copper spokesmen say business is definitely better.

March shipments are up and mills are recalling workers. Future auto and utility demands are seen as big factors in the upswing.

■ Copper business is definitely better. Not much, but the improvement reflects a trend.

Producers call gains of last week "modest." March shipments will certainly be better than February. And February, a short month, was better than January.

Custom smelters say business "looks very much better." Brass men are among the most conservative in the industry. This is because their business has been so bad for so long. But even they are becoming optimistic.

Workers Recalled — One mill spokesman sees some improvement. He says a mill in the West has already recalled workers.

Reports from all sales districts last week carried some note of optimism. This is the first time in a long time that all districts have agreed on an upswing.

Wire mills report utilities are doing more buying, which has brightened the picture considerably.

Customers Gain—Underlying the basic optimism that seems to have taken hold in the market is the improved business of copper customers.

The gains actually began a week or so ago. But political trouble in Rhodesia was making European buyers jumpy. London Metals Exchange prices, usually a good index of European attitudes, were up. Rhodesia and the Congo produce close to 25 pct of Free World copper.

U. S. industry was unsure of the real effect of overseas upsets on the U. S. market. The Rhodesian crisis has temporarily eased and the improvement in U. S. business has not changed.

Stable Inventories—Also, sellers say there is no real inventory rebuilding. They now feel most of the buying is for current needs.

Another factor: The improvement is taking place in the face of auto business that one seller calls "miserable."

The feeling is that with better weather, auto sales and auto buying of copper and brass products will add further weight to the already established upswing.

Titanium

The first expansion "the industry has had to crow about in some time" has been reported by Titanium Metals Corp. of America.

TMCA will spend about $2 million to expand its Toronto, O., mill producing titanium tubing. The company says this is to meet increased demand from non-military users, primarily chemical processors.

TMCA says sales to this industry in 1960 doubled the previous year's.

Brass

A recent Japanese offer illustrates the degree of foreign competition in the U. S. brass industry.

Anaconda American Brass Co. held a town meeting in Torrington, Conn., to explain the closing of the company's tube and sheet operations there. Richard Stewart, president, read a letter he had received.

A Japanese importer offered to take brass from Waterbury, Conn., 17 miles from Torrington, and underwrite the cost of shipping it to Japan. He would convert it to tube and ship it back to Waterbury.

The Japanese price for this tube was less than what it costs Anaconda American to make it at Waterbury.

The company will continue to operate its rod mill in Torrington. Tube and sheet facilities will be consolidated in Waterbury.

Tin prices for the week: Feb. 28—101.875; March 1—101.75; March 2—101.75; March 3—102.00; March 6—102.375.*

*Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferorus metals in FEBRUARY based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	29.00
Copper, Lake	29.00
Straits, Tin, New York	101.05
Zinc, E. St. Louis	11.50
Lead, St. Louis	10.80
Aluminum ingot	26.00

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date o change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	29.00	30.00	1/16/61
Copper (CS)	29.00	30.00	1/11/61
Copper (L)	29.00	30.00	1/16/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	84.50	12/6/56
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig Velasco, Tex. **NICKEL:** Port Colborne, Canada. **ZINC:** prime western. Other primary prices, pg. 127.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size*	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 3/4
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13	.....	51.36	55.32
Brass, Yellow	48.10	48.39	48.04	52.26
Brass, Low	50.65	50.94	50.59	54.71
Brass, Red	51.54	51.83	51.48	55.60
Brass, Naval	52.86	59.17	46.67	57.02
Muntz Metal	50.94	.....	46.25	.....
Comm. Bz.	52.98	53.27	52.92	56.79
Mang. Bz.	56.80	.....	50.20	.....
Phos. Bz. 5%	74.59	74.34	75.09	76.52

Free Cutting Brass Rod..... 33.71

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb) ..$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb..... 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $206 to $208
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz..$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 27.25
- No. 120 ..... 26.25
- No. 123 ..... 25.25

80-10-10 ingot
- No. 305 ..... 31.75
- No. 315 ..... 29.50

88-10-2 ingot
- No. 210 ..... 39.50
- No. 215 ..... 36.25
- No. 245 ..... 31.50

Yellow ingot
- No. 405 ..... 22.75

Manganese bronze
- No. 421 ..... 26.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.25-24.50
- 0.60 copper max. 24.00-24.25

Piston alloys (No. 132 type)..26.00-27.00
No. 12 alum. (No. 2 grade)...22.75-23.25
108 alloy 23.25-23.75
195 alloy 25.75-26.75
13 alloy (0.60 copper max.)...24.00-24.25
AXS-679 (1 pct zinc) 23.00-24.00

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 23.75-24.75
Grade 2—92-95% 22.50-23.50
Grade 3—90-92% 21.50-22.50
Grade 4—85-90% 21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	25	24¼
Yellow brass	19¼	17⅜
Red brass	22¼	21½
Comm. bronde	23	22¼
Mang. bronze	18⅛	17⅜
Free cutting rod ends.	18⅜	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 25½
No. 2 copper wire 24
Light copper 21¾
*Refining brass 22¼
Copper bearing material 21¼
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 25½
No. 2 copper wire 24
Light copper 21¾
No. 1 composition 21
No. 1 comp. turnings 20¼
Hvy yellow brass solids 16
Brass pipe 14½
Radiators 16½

Aluminum

Mixed old cast. ..... 12½—13
Mixed new clips ..... 14½—15
Mixed turnings, dry ..... 13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 22½—23
No. 2 copper wire ..... 20½—21
Light copper ..... 18½—19
Auto radiators (unsweated).. 13¼—13½
No. 1 composition ..... 17 —17½
No. 1 composition turnings... 16 —16½
Cocks and faucets ..... 13 —13½
Clean heavy yellow brass ... 12¼—12¾
Brass pipe ..... 13½—14
New soft brass clippings .... 13½—14
No. 1 brass rod turnings .... 13½—14

Aluminum

Alum. pistons and struts .... 6½— 7
Aluminum crankcase ..... 8½— 9
1100 (Ss) aluminum clippings 11½—12
Old sheet and utensils ..... 8½— 9
Borings and turnings ..... 4½— 5
Industrial castings ..... 9 — 9½
2020 (24s) clippings ..... 10 —10½

Zinc

New zinc clippings ..... 5½— 5¾
Old zinc ..... 2¾— 3
Zinc routings ..... 1¾— 2
Old die cast scrap ..... 1 — 1¼

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 23-23.50
Clean Monel turnings 16.50-17
Old sheet Monel 22-23
Nickel silver clippings, mixed. 18
Nickel silver turnings, mixed. 15

Lead

Soft scrap lead ..... 7 — 7½
Battery plates (dry) ..... 3 — 3¼
Batteries, acid free ..... 2 — 2¼

Miscellaneous

Block tin ..... 73 —75
No. 1 pewter ..... 55 —56
Auto babbitt ..... 41 —42
Mixed common babbitt ..... 9 — 9½
Solder joints ..... 12½—13
Small foundry type ..... 8½— 9
Monotype ..... 8¾— 9¼
Lino. and stereotype ..... 8 — 8¼
Electrotype ..... 7½— 7¾
Hand picked type shells ..... 5¼— 5¾
Lino. and stereo. dross ..... 1¾— 2¼
Electro dross ..... 1 — 1½

(Effective Mar. 6, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh Midland Butler Aliquippa N. Castle McKeesport Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3, B4, M10* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective Mar. 6, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Thin 0.25 lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*				$9.20 *U1*	$6.35 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*				Hollowware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	$6.25 *U1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	$6.35 *T2*
	Houston, Texas									6.65 *S2*			

• Electrogalvanized sheets. •• For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective Mar. 6, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*	6.375*P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.		5.675 *B3*									
	Fairless, Pa.	5.825 *U1*	5.825 *U1*									
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875*L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Mar. 6, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	7.87	9.71	10.16	10.28	8.44	9.13	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	16.76	.....	.....
Boston	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.79	16.69	23.89	21.04
Buffalo	.15	8.70	9.45	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.85	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		10.90	12.53	13.27	13.07	10.74	11.24	10.88	12.97	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	11.20	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		10.17	10.98	11.35[3]	11.73	9.90	9.81	9.58	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	9.59	11.42	10.95	11.76	9.43	9.93	9.57	11.77	17.17	15.87	21.87	21.12
Los Angeles		9.50[1]	11.20	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.13	10.50	.....	10.79	8.81	9.16	8.97	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.51	10.49	10.99	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.24	20.49
New York	.10	9.77	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.95	10.10	10.99	10.45	8.80	9.05	8.85	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		9.45	11.30	12.35	11.45	9.60	10.05	9.45	16.65	18.60	17.80	22.70	22.20
San Francisco	.10	10.27	11.79[2]	11.50	11.88	10.48	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.80	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.75	11.23	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.61	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13c zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Mar. 6, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

f.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Mar. 6, 1961)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50–32.75	32.00	29.50–34.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*, Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Ambridge Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****.	173	190	...	...	190	9.00	9.675
Atlanta *A8***.	173	191	...	212	197	9.00	9.75
Bartonville *K2***.	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	...	...	...	9.00	9.55
Chicago *W7*	173	.....	...	...	...	9.00	9.55†
Cleveland *A6*	.....	.....	...	...	...	.....	.....
Cleveland *A5*	.....	.....	...	...	...	9.00	.....
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	...	...	...	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***.	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**.	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****.	.....	.....	...	...	...	9.95	10.625
Kansas City *S2**.	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*.	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	...	9.95	10.50
Sparrows Pt. *B3***	175	.....	...	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	...	...	...	8.65	9.20
Worcester *A5*	179	.....	...	...	...	9.30	9.85
Williamsport *S5*	.....	.....	...	...	...	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

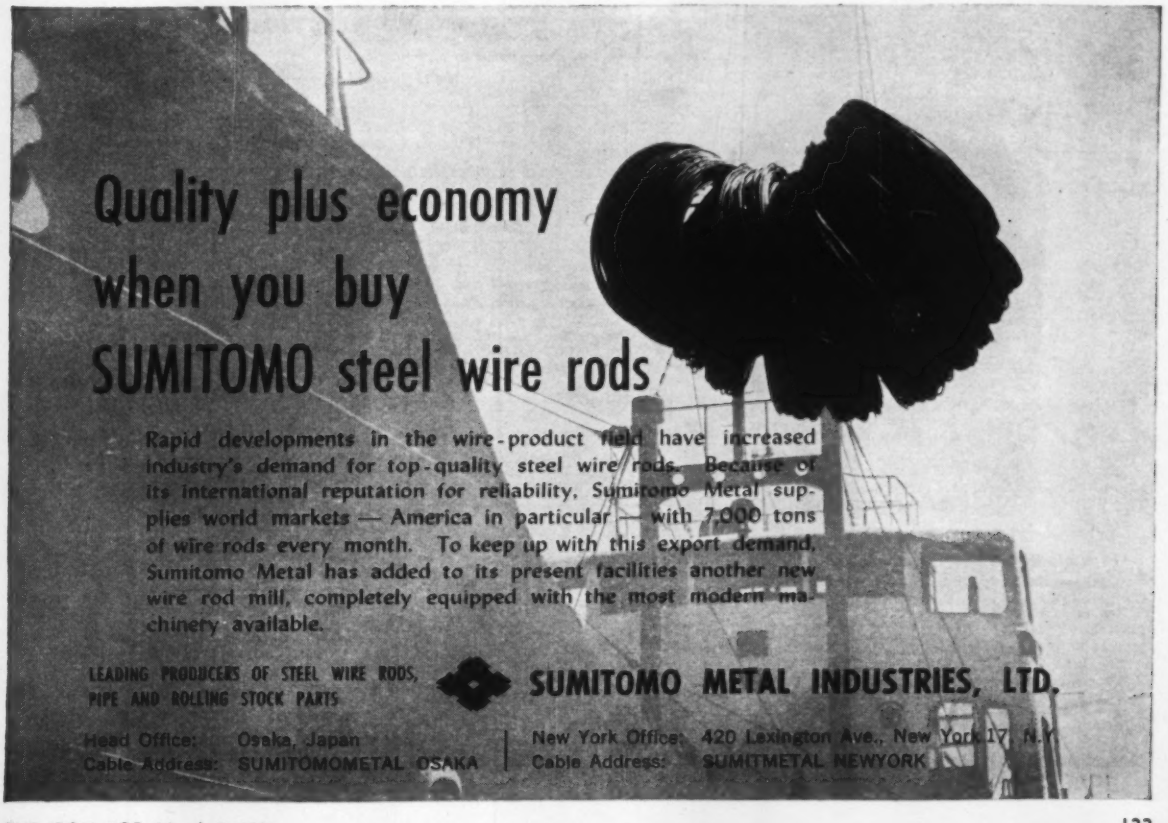
CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75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SUMITOMO steel wire rods
Rapid developments in the wire-product field have increased industry's demand for top-quality steel wire rods. Because of its international reputation for reliability, Sumitomo Metal supplies world markets — America in particular — with 7,000 tons of wire rods every month. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.
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Head Office: Osaka, Japan
Cable Address: SUMITOMOMETAL OSAKA
New York Office: 420 Lexington Ave., New York 17, N.Y.
Cable Address: SUMITMETAL NEWYORK

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	9.10	.....	.....	.....	.....
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	16.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. T. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7, S*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

- Rolled elliptical, 18 in. or longer, 5000 lb lots 42.50
- Electrodeposited, 5000 lb lots ... 35.50
- OFHC anodes ..... 40.50 to 43.50 (depending on shape)

Brass, 80-20, ball anodes, 2000 lb or more 50.50

Zinc, ball anodes, 2000 lb lots 18.75
(for elliptical add 1¢ per lb)

Nickel, 99 pct plus, rolled carbon, 5000 lb 1.0225
(Rolled depolarized add 3¢ per lb)

Cadmium, 5000 lb 1.50

Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.. 65.90

Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit 17.45

Nickel sulfate, 5000 lbs 29.00

Nickel chloride, freight allowed, 100 lb 45.00

Sodium cyanide, domestic, f.o.b. Chicago, 200 lb drums 24.00

Zinc cyanide, 100 lb, N. Y. 60.75

Potassium cyanide, 100 lb drum N. Y. 45.50

Chromic acid, flake type, 10,000 lb or more, N. Y. 30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

- Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50
- Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots 25.75
- Carbonyl Iron (200 lb lots) 88.00
- Welding Grades 8.10
- Cutting and Scarfing Grades 9.85
- Hydrogen reduced, domestic 11.25

Copper Powders

- Molding Grades
  - Electrolytic, domestic, f.o.b. shipping point. 15.00†
  - Atomized ..... 42.3 to 60.3
  - Reduced ..... 15.00†
  - Chemically Precipitated 43.5

Brass, 5000-lb lots ..... 32.3 to 48.9

Bronze, 5000-lb lots ..... 50.3 to 54.2

Chromium, electrolytic 5.00

Lead ..... 7.50†

Manganese, electrolytic ... $1.00

Molybdenum ..... $3.60 to $4.35

Nickel $1.15

Carbonyl Nickel, 20,000 lb lots $1.01

Nickel-Silver, 5000 lb lots.. 57.9 to 65.9

Silicon 70.00

Solder ..... 7.00†

Stainless Steel, 316 ..... $1.07

Stainless steel 304 ..... 89.00

Tin ..... 14.00†

Titanium, 99.25 + pct, per lb, f.o.b. $11.25

Tungsten, carbide grades... $3.25

Zinc ..... 19.5 to 32.7

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*)· Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, P2, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, $43.00; 1 side, $36.10.

(Effective Mar. 6, 1961)

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
Super duty, Mo., Pa., Md., Ky....	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk...	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays	163.00
Chicago District	168.00
Western Utah	183.00
California	185.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O.	163.00-168.00
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union, Pa.	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md.	$620.00
Gary, Ind.	658.50
Standard, Pascagoula, Miss.	647.50
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Baltimore	585.00

Magnesite Brick

Standard, Baltimore	$715.00
Chemically bonded, Baltimore	655.00
Chemically bonded, Pascagoula, Miss.	682.50

Grain Magnesite

St. ⅜ to ½-in. grains

Per net ton

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b., Pascagoula, Miss...	80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

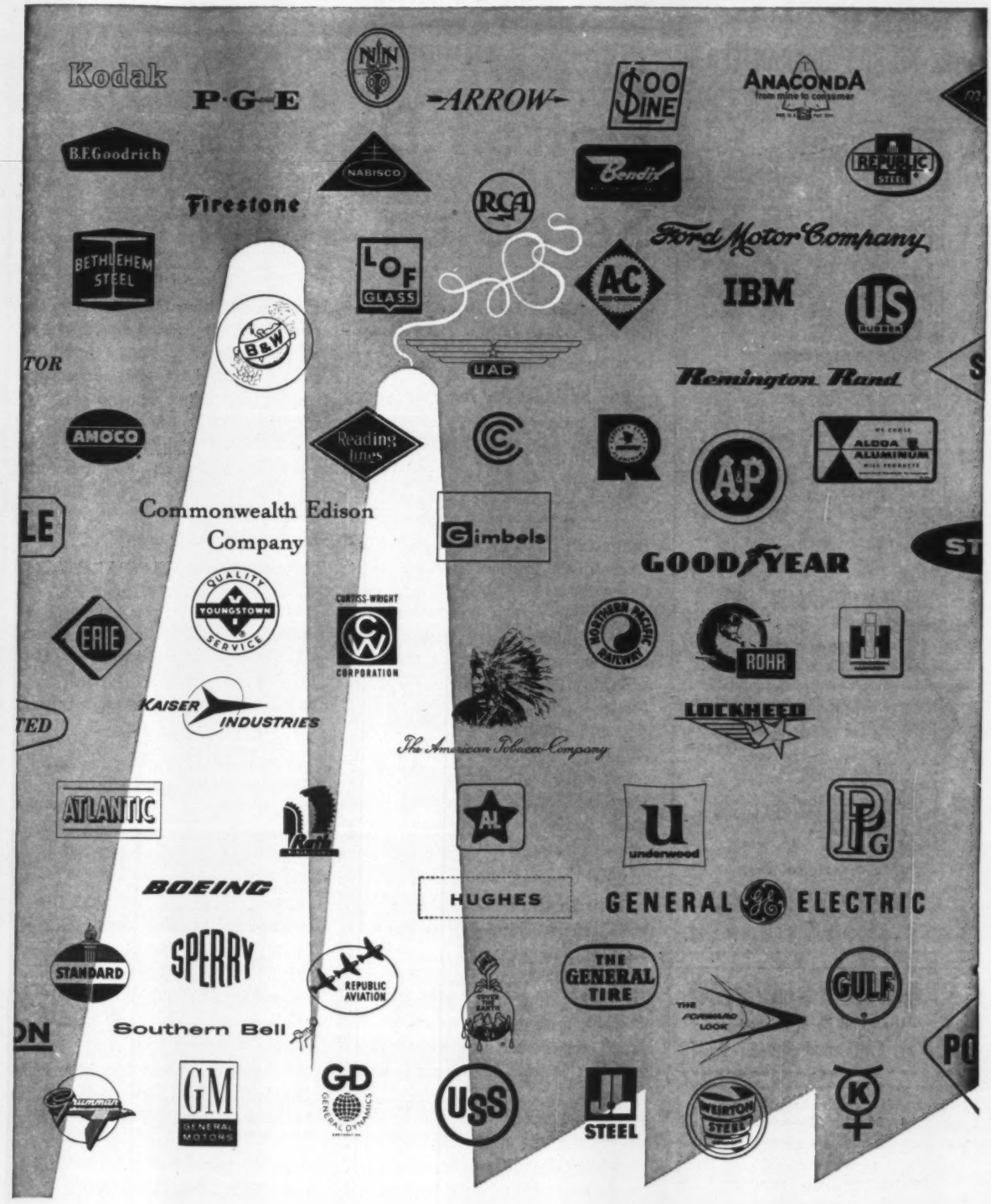
GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
Jones & Laughlin *	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

* Electricweld only.



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ELECTRICAL EQUIPMENT RE-NU-BILT GUARANTEED

M-G SETS 3PH-60 CY.

Qu.	KW	Make	RPM	DC Volts	DC Volts
2	4800(3U)	GE	450	300	2300/4600
1	3400	GE	450	300	2300/4600
1	2000	GE	514	600	2300/4600
2	1750/2100	GE	514	250/300	2300/4600
1	1750	GE	514	600	2300/4600
1	1500	GE	720	600	6600/13200
1	1000	GE	720	275	2300/4160
1	1000	GE	900	360	4000/6600
1	1000	GE	900	600	2300/4160
1	500	GE	900	125/250	440
1	500(New)	GE	1200	550	2300
1	500	GE	900	250	2300/4160
1	350	GE	900	125	440/2300/4160
1	300	GE	1200	275	2300/4160
1	300	GE	1200	250	440/2300
1	250	GE	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2300
1	200	El. Mby.	1200	250	2300/4600
1	150	GE	1200	275	2300
1	150	Whse.	1200	275	2300

D. C. MOTORS

Qu.	KW	Make	Type	Volts	RPM
1	3900(New)	GE	Enc. S.V.	475	320
1	3000(New)	Whse.	Enc. F.V.	525	600
3	2700	GE	Enc. S.V.	415	280
1	2250(New)	GE	Enc. S.V.	600	200/300
1	2200	GE	MCF	600	400/500
3	2000	GE	Enc. S.V.	250	230/350
2	1750	GE	Enc. S.V.	250	175/350
3	1500	Whse.	New	600	300/700
4	1500	Whse.	New	525	600
1	1300	GE	MCF	300	200/400
1	1200	GE	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D-8	600	600/900
2	900	GE	MCF	250	180/360
1	850	GE	MCF	250	85/170
1	750	GE	MCF	600	120/360
2	750	GE	MCF	600	450/900
2	645	SS		300	1000
4	600	Whse.		250	375/550
5	400	GM	D-8	250	300/900

BELYEA COMPANY, INC.

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Tel. OLdfield 3-3334

NILES GANTRY PLANER

New 1941 *Used 3 years*

22' x 70' planing area
2 rail heads
1 cross planing head
Speeds 15 to 90 FPM Double-cut
150 HP main drive
Serial No. 21728

1/10 of original cost

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RAILWAY EQUIPMENT

Used and Reconditioned

RAILWAY CARS and REPAIR PARTS

AIR DUMP CARS—Drop-Door Type
4, 30-Cu. Yd.—All-Steel

3 — FLAT CARS

HOPPER CARS
OPEN TOP—Also COVERED

DIESEL-ELECTRIC LOCOMOTIVES
25-Ton to 120-Ton. Std. Ga.

1—100-TON WHITING DROP PIT TABLE

IRON & STEEL PRODUCTS, INC.

13496 S. Brainard Ave. Chicago 33, Ill. Ph. Mitchell 6-1212

51-B E. 42nd St. New York 17, N. Y. Ph. YUkon 6-4766

Detroit Dealers Sense an Upturn

Pickup in interest and inquiries has some dealers in Detroit in a hopeful mood.

But business so far this year is well below the rate of a year ago. And orders are still scarce.

■ More customers are showing more interest in Detroit used machinery. Interest has come the past two weeks in the form of telephone calls by prospective buyers, increased floor traffic at warehouses, and inquiries about used machinery ads in newspapers.

Without pinning down a reason for the renewed interest, Detroit dealers hope the trend will continue. Many think it will, as clients who have stalled spending because of slow business, start breaking from their shells to make needed purchases of equipment and to replenish stocks.

First in Months—A dealer who sold some machinery to people who saw his newspaper ad says, with a hint of encouragement, that it was the first time this happened in months. The machinery was mostly small pieces such as punch presses and belt grinders, and went to small shops.

Despite recent optimistic developments, the first quarter has not been overly kind to Detroit dealers so far. A slackening in business that started in mid-December drifted through January and into February. Although interest is growing, it still must be translated into good, solid orders.

Outlook Improved—To a man, dealers say first quarter sales will be much lower than the corresponding period a year ago. January-March may be as good, perhaps a bit better, than October-December, depending on March. Most dealers look for improvement in the next month or two. A great deal may hinge, however, on a pickup in auto production and tool and die activity, which have been slumping this year to the harm of the used machine trade.

Competition has been sharp in 1961. Reflecting the competitive nature of the market, prices have tended to weaken since the first of the year. To try to stimulate sales, dealers have dropped prices on a variety of equipment, some reportedly as much as 25 pct below 1960.

What Sells—In many cases, auction prices are holding up well, although there is evidence of some weakening. There are many auctions. Attendance is good or poor, depending on the quality of the machinery. Late model, good, clean equipment attracts an audience. Older, poorly conditioned goods don't. A specialist in production machinery says his company is attending fewer auctions because of its high inventory.

Supplies of used machinery in Detroit, as in many parts of the country, are as high as they've ever been. They've been at this level for months. But it isn't keeping dealers out of the market entirely.

Export Factor — "We don't go searching for machinery," a small dealer says, "but if we can find a bargain, we'll buy." One of the city's largest companies says despite an ample inventory, he can't fill every request that comes in on the spot.

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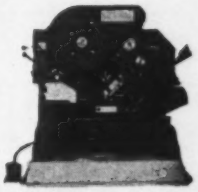

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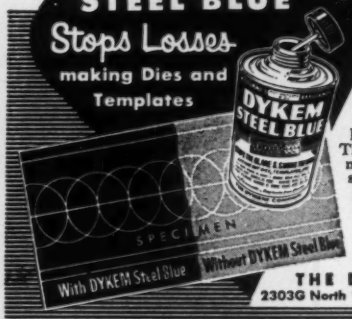

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New Bliss inclinables take front seat at American Seating

Shown here are three of four new Bliss C-60 inclinable presses recently installed at American Seating Company, Grand Rapids, Mich. All four presses get day-in, day-out use in a variety of operations . . . they blank, draw, pierce, perforate, punch, trim, form and notch many types and sizes of sheet metal parts that American Seating, world's largest producer of fine institutional furniture, uses in its lines of chairs, desks and other furniture. The new "C" inclinables, with their extremely rugged frames, large bed area and long stroke adjustment, are well-suited for this general-purpose service, with its frequent die changes and strenuous single-tripping. All presses are non-geared and equipped with the Bliss CK crankshaft-mounted air-friction clutch and brake.

If you would like details of Bliss' new "C" inclinables, we will be glad to send you a free copy of our Bulletin 2F. Illustrated in color, it is yours for the asking. Or, if you prefer, our local representative will be happy to give you complete information.

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